Supporting Information: Identification of receiver triplet state in the ultrafast intersystem crossing of carbonylpyrenes

Lekshmi R S, Gayathri B Kurup, Sivaranjana Reddy Vennapusa

Indian Institute of Science Education and Research Thiruvananthapuram, Maruthamala P O, Vithura, Thiruvananthapuram 695551, India E-mail: siva@iisertvm.ac.in

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Table S1: Numbering, symmetry and harmonic frequency components of vibrational modes of P calculated at B3LYP/6-311G(d,p) level of theory.

No.(Sym.)	Freq (in $\rm cm^{-1}$)	No.(Sym.)	Freq (in $\rm cm^{-1}$)	No.(Sym.)	Freq (in $\rm cm^{-1}$)
ν_1 (B3U)	98.4254	ν_{26} (B1U)	834.4631	ν_{51} (AG)	1427.4565
ν_2 (AU)	152.2882	$\nu_{27}~({\rm B2G})$	846.6147	ν_{52} (B3G)	1434.2661
ν_3 (B3U)	214.0022	ν_{28} (B3U)	859.3325	ν_{53} (B2U)	1457.8068
ν_4 (B1G)	249.3383	ν_{29} (AU)	902.4360	ν_{54} (B1U)	1459.4816
$\nu_5 (B2G)$	262.5502	ν_{30} (B1G)	916.2475	ν_{55} (B1U)	1483.2710
$\nu_6 (B2U)$	359.4307	ν_{31} (B2G)	973.5891	ν_{56} (B2U)	1515.5531
ν_7 (AU)	402.0617	ν_{32} (AU)	979.8860	$\nu_{57}~({\rm B3G})$	1535.7080
$\nu_8 (AG)$	412.1204	$\nu_{33}~({\rm B2U})$	980.8016	ν_{58} (AG)	1596.4104
ν_9 (B3G)	462.6067	ν_{34} (B3U)	982.0027	ν_{59} (B3G)	1626.0974
ν_{10} (B3U)	500.4332	ν_{35} (B2G)	990.9897	ν_{60} (B1U)	1635.8261
ν_{11} (B1U)	507.1292	ν_{36} (B1U)	1014.9363	ν_{61} (B2U)	1645.9468
ν_{12} (B3G)	508.6963	ν_{37} (AG)	1091.2967	ν_{62} (AG)	1670.7893
$\nu_{13}~({\rm B2G})$	513.5979	ν_{38} (B1U)	1113.9498	ν_{63} (B1U)	3155.9250
ν_{14} (B1G)	538.5187	ν_{39} (B3G)	1127.0684	ν_{64} (B3G)	3156.1961
ν_{15} (B2U)	554.2838	ν_{40} (B2U)	1165.3839	ν_{65} (AG)	3159.4343
ν_{16} (B2G)	585.9834	ν_{41} (AG)	1168.0821	ν_{66} (B1U)	3160.0565
ν_{17} (AG)	595.4396	ν_{42} (B3G)	1198.3135	ν_{67} (B2U)	3167.1859
ν_{18} (AU)	687.8000	ν_{43} (B2U)	1204.3742	ν_{68} (B3G)	3168.1101
ν_{19} (B1U)	704.0640	ν_{44} (B2U)	1232.1106	ν_{69} (AG)	3175.3078
ν_{20} (B3U)	726.2456	ν_{45} (AG)	1262.6535	ν_{70} (B2U)	3175.4013
$\nu_{21}~({\rm B3G})$	749.5580	ν_{46} (B3G)	1264.1479	$\nu_{71}~({\rm B1U})$	3184.2757
$\nu_{22}~(\mathrm{B3U})$	756.9113	ν_{47} (B1U)	1268.3282	ν_{72} (AG)	3184.7420
$\nu_{23}~({\rm B2G})$	783.5288	ν_{48} (B2U)	1342.7285		
ν_{24} (B1G)	814.6937	ν_{49} (AG)	1351.6222		
ν_{25} (AG)	814.8641	ν_{50} (B3G)	1399.9811		

No.(Sym.)	$Freq (in cm^{-1})$	No.(Sym.)	$Freq (in cm^{-1})$	No.(Sym.)	Freq (in $\rm cm^{-1}$)
ν_1 (A)	48.3148	ν_{39} (B)	831.0852	ν_{77} (B)	1483.3132
ν_2 (B)	50.0960	ν_{40} (A)	831.6901	ν_{78} (A)	1483.6930
ν_3 (A)	61.9289	ν_{41} (B)	842.9225	ν_{79} (A)	1490.0655
ν_4 (B)	64.8000	ν_{42} (B)	856.5355	ν_{80} (B)	1516.6380
ν_5 (B)	125.4629	ν_{43} (A)	866.5097	ν_{81} (B)	1540.1034
ν_6 (A)	145.8265	ν_{44} (A)	917.8238	ν_{82} (A)	1553.6222
ν_7 (A)	168.1223	ν_{45} (B)	951.6314	ν_{83} (B)	1615.6819
ν_8 (B)	172.3892	ν_{46} (A)	975.9206	ν_{84} (A)	1622.5586
ν_9 (B)	174.8179	ν_{47} (B)	980.9398	ν_{85} (B)	1645.7144
ν_{10} (A)	188.2988	ν_{48} (A)	987.0584	ν_{86} (A)	1665.3875
ν_{11} (B)	229.9050	$ u_{49}$ (B)	992.9056	ν_{87} (B)	1751.7380
ν_{12} (A)	266.8663	$\nu_{50}~(\mathrm{B})$	999.1643	ν_{88} (A)	1755.4813
ν_{13} (B)	270.7871	ν_{51} (B)	1018.7982	ν_{89} (B)	3036.6912
ν_{14} (B)	300.2219	ν_{52} (A)	1034.3376	ν_{90} (A)	3036.7128
ν_{15} (A)	309.2736	ν_{53} (B)	1039.3946	ν_{91} (A)	3102.8402
ν_{16} (B)	345.9302	ν_{54} (A)	1060.1760	ν_{92} (B)	3102.8485
$\nu_{17}~({\rm A})$	365.4432	ν_{55} (A)	1104.3420	ν_{93} (B)	3136.4318
ν_{18} (A)	424.3614	$\nu_{56}~(\mathrm{B})$	1133.0530	ν_{94} (A)	3136.4834
ν_{19} (B)	433.6336	ν_{57} (A)	1166.5286	ν_{95} (A)	3163.3564
ν_{20} (A)	484.4566	ν_{58} (B)	1185.6324	ν_{96} (B)	3167.2804
ν_{21} (B)	490.8965	ν_{59} (A)	1193.3055	ν_{97} (A)	3168.8131
ν_{22} (B)	508.7036	ν_{60} (B)	1199.9434	ν_{98} (B)	3171.7997
ν_{23} (B)	511.9942	ν_{61} (B)	1211.6843	ν_{99} (A)	3188.7418
ν_{24} (A)	533.3391	ν_{62} (B)	1242.8887	ν_{100} (A)	3212.5049
ν_{25} (B)	534.2843	ν_{63} (B)	1254.9136	ν_{101} (B)	3225.1673
ν_{26} (A)	555.8849	ν_{64} (A)	1269.1920	ν_{102} (A)	3225.2893
ν_{27} (B)	564.1284	ν_{65} (A)	1277.3792		
ν_{28} (A)	590.8234	ν_{66} (B)	1338.3130		
ν_{29} (B)	626.9759	ν_{67} (A)	1366.6826		
ν_{30} (A)	647.1956	ν_{68} (A)	1385.5320		
ν_{31} (B)	653.2707	ν_{69} (B)	1386.2529		
ν_{32} (A)	663.0799	ν_{70} (A)	1393.2832		
ν_{33} (B)	707.1562	ν_{71} (B)	1395.0052		
ν_{34} (A)	707.7125	ν_{72} (B)	1412.6582		
ν_{35} (A)	719.1865	ν_{73} (A)	1443.8934		
ν_{36} (B)	733.7522	ν_{74} (B)	1446.2475		
ν_{37} (B)	771.4456	ν_{75} (B)	1474.7533		
ν_{38} (A)	827.2436	ν_{76} (A)	1474.8586		

Table S2: Numbering, symmetry and harmonic frequency components of vibrational modes of AP2 calculated at B3LYP/6-311G(d,p) level of theory.

Table S3: Numbering, symmetry and harmonic frequency components of vibrational modes of AP4 calculated at B3LYP/6-311G(d,p) level of theory.

No.(Sym.)	Freq (in cm^{-1})	No.(Sym.)	Freq (in $\rm cm^{-1}$)	No.(Sym.)	Freq (in cm^{-1})
ν_1 (AU)	30.2273	ν_{54} (AU)	832.5737	ν_{107} (AU)	1589.6381
$\nu_2 \ (BU)$	40.3238	ν_{55} (AG)	837.5251	ν_{108} (BG)	1606.0219
ν_3 (AG)	52.1607	ν_{56} (BU)	843.5187	ν_{109} (BU)	1646.8165
ν_4 (BG)	52.3407	ν_{57} (BG)	885.9474	ν_{110} (AG)	1659.2871
ν_5 (BU)	54.4024	ν_{58} (AG)	929.0344	ν_{111} (BG)	1755.7936
ν_6 (AU)	56.7593	ν_{59} (BU)	946.8030	ν_{112} (BU)	1755.9127
ν_7 (AG)	78.8058	ν_{60} (BG)	963.3721	ν_{113} (AU)	1757.5353
ν_8 (BG)	103.1405	ν_{61} (AU)	976.2488	ν_{114} (AG)	1761.0436
ν_9 (BU)	105.8821	ν_{62} (AG)	985.6325	ν_{115} (BG)	3037.7042
ν_{10} (AG)	144.4761	ν_{63} (BG)	990.3140	ν_{116} (AU)	3037.7242
ν_{11} (AU)	151.4541	ν_{64} (AU)	992.0594	ν_{117} (BU)	3037.7642
ν_{12} (BU)	153.4361	ν_{65} (BU)	1000.1593	ν_{118} (AG)	3037.7848
ν_{13} (AU)	167.1370	ν_{66} (BG)	1007.3150	ν_{119} (AU)	3103.5618
ν_{14} (BG)	167.1537	ν_{67} (AU)	1034.1337	ν_{120} (BG)	3103.5671
ν_{15} (AG)	171.2940	ν_{68} (BU)	1034.5790	ν_{121} (AG)	3103.6209
ν_{16} (BU)	174.6969	ν_{69} (AG)	1036.0336	ν_{122} (BU)	3103.6311
ν_{17} (BG)	194.9366	ν_{70} (BU)	1038.2146	ν_{123} (BG)	3137.3281
ν_{18} (AU)	209.5500	ν_{71} (BG)	1039.3412	ν_{124} (AU)	3137.3443
ν_{19} (BU)	241.3192	ν_{72} (AU)	1080.1457	ν_{125} (BU)	3137.3971
ν_{20} (AG)	272.5689	ν_{73} (AG)	1133.4944	ν_{126} (AG)	3137.4775
ν_{20} (RG)	276.2921	ν_{73} (RG) ν_{74} (BG)	1138.6556	ν_{123} (AU)	3212.9428
ν_{22} (AG)	276.4776	ν_{75} (BU)	1200.7678	ν_{128} (AG)	3213.0611
ν_{22} (BG)	304.7693	ν_{76} (BG)	1203 0145	ν_{120} (BG)	3213 4032
ν_{23} (BU)	317.3768	v76 (20)	1207 4304	$\nu_{129} (AU)$	3213.4431
ν_{24} (AU)	330,4686	ν_{77} (AU)	1214 4213	ν_{130} (HC) ν_{131} (BU)	3229.9576
ν_{23} (HU)	348.0975	ν_{78} (HU)	1216.2391	ν_{131} (BU)	3230.0883
ν_{27} (AU)	379.6583	ν_{80} (BU)	1245.4556	- 132 (= +)	
ν_{28} (BG)	380.3656	ν_{80} (BC)	1249.1632		
228 (EG)	388.7587	ν_{81} (AG)	1275.8627		
229 (HQ)	462,9933	ν_{82} (AU)	1284.1516		
ν_{21} (AU)	491.5166	ν_{83} (HU)	1337.1036		
ν_{22} (AG)	499.8981	ν_{85} (AG)	1369.1968		
ν_{22} (BG)	509.3557	ν_{86} (AG)	1385.4120		
ν_{24} (BG)	525.6432	ν_{87} (BG)	1385.9199		
ν_{35} (BU)	531.0913	ν_{88} (AU)	1387.3990		
ν_{26} (BG)	542.9742	ν_{80} (BG)	1387.4350		
ν_{37} (AG)	554.4809	ν_{90} (BU)	1388.4439		
ν_{38} (AU)	574.2593	ν_{91} (AG)	1389.8790		
ν_{39} (BG)	589.2751	ν_{92} (BU)	1394.1417		
ν_{40} (AG)	591.2928	ν_{93} (AU)	1410.5284		
ν_{41} (BU)	612.3613	ν_{94} (BG)	1431.9675		
ν_{42} (AU)	616.1313	$\nu_{94} (= =)$ $\nu_{05} (BG)$	1473.9667		
ν_{42} (AU)	655.9481	$\nu_{95} (\Delta U)$	1474.2320		
ν_{44} (BU)	658.9983	ν_{07} (BU)	1475.3306		
ν_{44} (AG)	669.7171	ν_{97} (BC)	1475 6384		
ν_{46} (BG)	679.2529	ν_{99} (AU)	1483.8964		
ν_{47} (AG)	680.3140	ν_{100} (RG)	1484.1027		
ν_{48} (AU)	710.6873	ν_{101} (BII)	1484,1510		
ν_{49} (BG)	712.0282	ν_{102} (AG)	1485.1042		
ν_{50} (AU)	733.4121	ν_{102} (AU)	1492.7456		
ν_{51} (BU)	733.8512	ν_{104} (BU)	1522.8208		
ν_{52} (BU)	760.8984	ν_{104} (BC)	1533.0119		
$\nu_{\rm 52}$ (BC)	817 1631	ν_{100} (RC)	1538 7536		
~53 (DG)	011.1001	v106 (DG)	1000.1000		

Table S4: VEE (in eV) of **P**, **AP2** & **AP4** obtained at B3LYP/6-311G(d,p) level of theory. Oscillator strength shown in paranthesis.

	Р	AP2	AP4		Р	AP2	AP4
S_1	$3.6924 \ (0.2537)$	$3.2633\ (0.3646)$	$3.0198\ (0.4607)$	T_1	2.1580	1.9434	1.7892
S_2	3.7576(0.0002)	$3.3499\ (0.0106)$	$3.0899\ (0.0235)$	T_2	3.4459	2.9345	2.6941
S_3	$4.3744 \ (0.0000)$	$3.5743\ (0.0181)$	$3.2234\ (0.0000)$	T_3	3.5684	3.1456	2.8945
S_4	$4.6016\ (0.2648)$	$3.5784 \ (0.0014)$	$3.3917\ (0.0000)$	T_4	3.5920	3.2336	3.0049
S_5	4.6249(0.0000)	$4.0956\ (0.0470)$	$3.3945\ (0.0479)$	T_5	3.8952	3.4517	3.0397
S_6	$5.0539\ (0.0000)$	4.2718(0.1104)	$3.4398\ (0.0113)$	T_6	3.8969	3.5152	3.0921

Table S5: Vibronic Hamiltonian matrices (H') constructed for the singlet and triplet manifold of **P**, **AP2** & **AP4**.

Singlets:

P, AP2 & AP4:



Triplets:

P & AP2:

$$H' = \begin{pmatrix} E_{T_1}^{(0)} + \sum_t \kappa_t^{(T_1)} Q_t & \sum_{nt} \lambda_{nt}^{(12)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(13)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(14)} Q_{nt} \\ \sum_t \lambda_{nt}^{(21)} Q_{nt} & E_{T_2}^{(0)} + \sum_t \kappa_t^{(T_2)} Q_t & \sum_n \lambda_{nt}^{(23)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(24)} Q_{nt} \\ \sum_t \lambda_{nt}^{(31)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(32)} Q_{nt} & E_{T_3}^{(0)} + \sum_t \kappa_t^{(T_3)} Q_t & \sum_{nt} \lambda_{nt}^{(34)} Q_{nt} \\ \sum_{nt} \lambda_{nt}^{(41)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(42)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(43)} Q_{nt} & E_{T_4}^{(0)} + \sum_t \kappa_t^{(T_4)} Q_t \end{pmatrix}$$

AP4:

$$H' = \begin{pmatrix} E_{T_1}^{(0)} + \sum_t \kappa_t^{(T_1)} Q_t & \sum_{nt} \lambda_{nt}^{(12)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(13)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(14)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(15)} Q_{nt} \\ \sum_{nt} \lambda_{nt}^{(21)} Q_{nt} & E_{T_2}^{(0)} + \sum_t \kappa_t^{(T_2)} Q_t & \sum_{nt} \lambda_{nt}^{(23)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(24)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(25)} Q_{nt} \\ \sum_{nt} \lambda_{nt}^{(31)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(32)} Q_{nt} & E_{T_3}^{(0)} + \sum_t \kappa_t^{(T_3)} Q_t & \sum_{nt} \lambda_{nt}^{(34)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(35)} Q_{nt} \\ \sum_{nt} \lambda_{nt}^{(41)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(42)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(43)} Q_{nt} & E_{T_4}^{(0)} + \sum_t \kappa_t^{(T_4)} Q_t & \sum_{nt} \lambda_{nt}^{(45)} Q_{nt} \\ \sum_{nt} \lambda_{nt}^{(51)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(52)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(53)} Q_{nt} & \sum_{nt} \lambda_{nt}^{(54)} Q_{nt} & E_{T_5}^{(0)} + \sum_t \kappa_t^{(T_5)} Q_t \end{pmatrix}$$

Table S6: Linear intrastate coupling parameters (κ) for singlet electronic states of **P** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength ($\kappa^2/2\omega^2$) obtained for each vibrational mode is shown in parameters.

AG mode (Freq, eV)	κ^{S_1}	κ^{S_2}	κ^{S_3}	κ^{S_4}	κ^{S_5}	κ^{S_6}
$\nu_8(0.0511)$	-0.0363(0.2523)	-0.0108(0.0223)	-0.0226(0.0978)	-0.0165(0.0524)	-0.0902(1.5592)	-0.0261(0.1305)
$\nu_{17}(0.0738)$	-0.0151(0.0209)	-0.0359(0.1183)	-0.0163(0.0245)	-0.0396(0.1442)	-0.0310(0.0885)	-0.0434(0.1726)
$\nu_{25}(0.1010)$	-0.0088(0.0038)	-0.0029(0.0004)	-0.0006(0.0001)	-0.0051(0.0013)	-0.0771(0.2914)	0.0203(0.0202)
$\nu_{37}(0.1353)$	-0.0165(0.0074)	-0.0475(0.0616)	-0.0130(0.0046)	-0.0450(0.0554)	0.0169(0.0078)	-0.0242(0.0160)
$\nu_{41}(0.1448)$	-0.0333(0.0264)	0.0115(0.0032)	-0.0735(0.1289)	-0.0007(0.0001)	-0.0434(0.0450)	-0.0448(0.0478)
$\nu_{45}(0.1565)$	0.1123(0.2575)	0.0883(0.1592)	0.0453(0.0420)	0.0640(0.0837)	0.0501(0.0513)	0.0791(0.1277)
$\nu_{49}(0.1676)$	-0.0086(0.0013)	-0.0234(0.0097)	-0.0512(0.0467)	-0.0185(0.0061)	-0.1039(0.1923)	0.0598(0.0637)
$\nu_{51}(0.1770)$	-0.1037(0.1716)	-0.1212(0.2344)	-0.0084(0.0011)	-0.0880(0.1235)	-0.0309(0.0152)	-0.0248(0.0098)
$\nu_{58}(0.1979)$	-0.0068(0.0006)	0.0559(0.0399)	0.0576(0.0424)	0.0534(0.0364)	0.0138(0.0024)	-0.0367(0.0172)
$\nu_{62}(0.2072)$	0.1486(0.2572)	-0.0127(0.0019)	0.2721(0.8625)	0.0101(0.0012)	0.2202(0.5645)	0.1334(0.2074)
$\nu_{65}(0.3917)$	-0.0054(0.0001)	0.0009(0.0001)	0.0006(0.0001)	-0.0008(0.0001)	-0.0130(0.0005)	-0.0122(0.0005)
$\nu_{69}(0.3937)$	-0.0080(0.0002)	-0.0025(0.0001)	-0.0223(0.0016)	-0.0046(0.0001)	-0.0119(0.0005)	-0.0088(0.0002)
$\nu_{72}(0.3949)$	0.0096(0.0003)	0.0164(0.0009)	0.0108(0.0004)	0.0154(0.0008)	0.0084(0.0002)	0.0138(0.0006)

Table S7: Linear interstate coupling parameters (λ) for singlet electronic states of **P** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength $(\lambda^2/2\omega^2)$ obtained for each vibrational mode is shown in paranthesis.

Vibrational mode (Freq. eV)	$^{\lambda S_1-S_2}$	$^{\lambda}S_{1}-S_{3}$	$^{\lambda_{S_1-S_4}}$	$^{\lambda_{S_1-S_5}}$	$^{\lambda S_1-S_6}$	$^{\lambda S_2-S_3}$	$^{\lambda S_2-S_5}$	$^{\lambda_{S_2-S_6}}$	$^{\lambda S_3-S_4}$	$^{\lambda}S_3 - S_6$	$^{\lambda S_4-S_5}$	$^{\lambda S_4-S_6}$	$\lambda S_5 - S_6$
$\nu_6(0.0446)$		0.0267(0.1792)		0.0284(0.2027)									
$\nu_{9}(0.0574)$	0.0090(0.0123)		0.0346(0.1817)						'	0.0401(0.2440)			0.0344(0.1796)
$\nu_{11}(0.0629)$					0.0045(0.0026)		0.0305(0.1176)				0.0053(0.0035)		
$\nu_{12}(0.0631)$	0.0081(0.0082)		0.0328(0.1351)	,	. 1		. 1	,	,	0.0164(0.0338)	. 1		0.0139(0.0243)
$\nu_{15}(0.0687)$		0.0473(0.2370)	. 1	0.0555(0.3263)	,			,	,			0.0305(0.0985)	
$\nu_{19}(0.0873)$					0.0159(0.0166)	0.0276(0.0500)	0.1221(0.9781)		,		0.0369(0.0893)		,
$\nu_{21}(0.0929)$	0.0070(0.0028)		0.0224(0.0291)							0.0090(0.0047)			
$\nu_{26}(0.1035)$					0.0267(0.0333)		0.1131(0.5971)				0.0355(0.0588)		
$\nu_{33}(0.1216)$		0.0160(0.0087)						0.0112(0.0042)				0.0150(0.0076)	
$\nu_{36}(0.1258)$					0.0218(0.0150)	0.0327(0.0338)	0.0733(0.1698)		,		0.0169(0.0090)		'
$\nu_{38}(0.1381)$						0.0249(0.0163)	0.0394(0.0407)				0.0072(0.0014)		
$\nu_{39}(0.1397)$	0.0129(0.0043)		0.0441(0.0498)							0.0240(0.0148)			0.0191(0.0093)
$\nu_{40}(0.1445)$,				
$ u_{42}(0.1486) $	0.0087(0.0017)		0.0381(0.0017)										
$ u_{43}(0.1493) $								0.0432(0.0419)				0.0271(0.0165)	
$ u_{44}(0.1528) $		0.0198(0.0084)						0.0037(0.0003)				0.0124(0.0033)	
$ u_{46}(0.1567) $	0.0068(0.0009)		0.0355(0.0257)						'				
$ u_{47}(0.1573) $					0.0276(0.0154)	0.0359(0.0260)	0.0790(0.1261)		,		0.0189(0.0072)		
$ u_{48}(0.1665) $		I										0.0397(0.0284)	
$\nu_{50}(0.1736)$	0.0254(0.0107)		0.0954(0.1510)							0.0975(0.1577)			0.0563(0.0526)
$\nu_{52}(0.1778)$	0.0073(0.0008)	,	0.0184(0.0054)			,	,		,		,	,	,
$\nu_{53}(0.1807)$		0.0652(0.0651)		0.0359(0.0197)				0.0276(0.0117)	,				,
$ u_{54}(0.1810) $,	ı	ı	0.0222(0.0075)	0.1531(0.3577)	ı	1		0.0502(0.0385)	,	,
$\nu_{55}(0.1839)$						0.0533(0.0420)	0.1874(0.5192)		,		0.0603(0.0538)		
$\nu_{56}(0.1879)$		0.0863(0.1055)		0.0782(0.0866)				0.0337(0.0161)	,				
$\nu_{57}(0.1904)$	0.0024(0.0001)								,				
$\nu_{59}(0.2016)$	0.0387(0.0184)		0.1404(0.2425)							0.1151(0.1630)			0.0594(0.0434)
$\nu_{60}(0.2028)$,	,		0.0636(0.0492)	0.0330(0.0132)	0.1463(0.2602)		,		0.0486(0.0287)	,	,
$ u_{61}(0.2041) $		0.0228(0.0062)		0.0596(0.0426)				0.0693(0.0576)	,			0.0593(0.0422)	,
$\nu_{63}(0.3913)$					0.0048(0.0001)		0.0237(0.0018)		,		0.0054(0.0001)		,
$\nu_{64} (0.3913)$	0.0018(0.0001)		0.0050(0.0001)	ı	ı	,	,	ı	1	0.0108(0.0001)	,	,	,
$\nu_{66}(0.3918)$,	ı	0.0042(0.0001)	0.0071(0.0002)	,	ı	ī	,	,	,	,
$\nu_{67}(0.3927)$		0.0178(0.0010)	,	ı	ı	,	,	0.0009(0.0001)	ī	,	,	0.0045(0.0001)	,
$\nu_{68}(0.3928)$	0.0038(0.0001)	,	0.0096(0.0001)	ı	ı	,	,	ı	ī	,	,	,	0.0087(0.0001)
$\nu_{70}(0.3937)$,	,	,	0.0179(0.0010)	,	,	,	,	ı	,	,	0.0014(0.0001)	,
(0 2048)				,	0.0038/0.001)	0.0085(0.0002)	0.0048/0.001)	,			(1000 0/1000 0		

Table S8: Linear intrastate coupling parameters (κ) for triplet electronic states of **P** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength ($\kappa^2/2\omega^2$) obtained for each vibrational mode is shown in parameters.

AG mode (Freq, eV)	κ^{T_1}	κ^{T_2}	κ^{T_3}	κ^{T_4}	κ^{T_5}	κ^{T_6}
$\nu_8(0.0511)$	-0.0557(0.5946)	-0.0168(0.0537)	-0.0009(0.0002)	-0.0416(0.3321)	-0.0352(0.2375)	0.0276(0.1454)
$\nu_{17}(0.0738)$	-0.0058(0.0031)	-0.0308(0.0868)	-0.0291(0.0778)	-0.0411(0.1553)	-0.0749(0.5149)	-0.0531(0.2589)
$\nu_{25}(0.1010)$	-0.0128(0.0080)	0.0050(0.0012)	-0.0004(0.0001)	-0.0211(0.0218)	-0.0022(0.0002)	0.0230(0.0259)
$\nu_{37}(0.1353)$	-0.0199(0.0108)	-0.0531(0.0769)	0.0115(0.0036)	-0.0434(0.0515)	-0.0889(0.2157)	-0.0363(0.0359)
$\nu_{41}(0.1448)$	-0.0530(0.0669)	0.0139(0.0046)	-0.0990(0.2336)	0.0088(0.0018)	-0.0312(0.0233)	0.0607(0.0878)
$\nu_{45}(0.1565)$	0.1570(0.5032)	0.0897(0.1532)	-0.0176(0.0063)	0.0909(0.1688)	0.0085(0.0015)	0.0685(0.0957)
$\nu_{49}(0.1676)$	-0.0136(0.0033)	-0.0181(0.0058)	-0.0562(0.0563)	-0.0267(0.0127)	-0.0403(0.0289)	0.0892(0.1415)
$\nu_{51}(0.1770)$	-0.1141(0.2079)	-0.1086(0.1883)	-0.0489(0.0382)	-0.1184(0.2237)	-0.0924(0.1364)	0.0232(0.0086)
$\nu_{58}(0.1979)$	-0.0219(0.0061)	0.0539(0.0371)	0.0999(0.1273)	0.0435(0.0241)	-0.0984(0.1236)	0.1457(0.2710)
$\nu_{62}(0.2072)$	0.2454(0.7012)	-0.0091(0.0010)	0.2505(0.7308)	0.0023(0.0001)	0.1099(0.1407)	-0.2028(0.4790)
$\nu_{65}(0.3917)$	-0.0099(0.0003)	0.0039(0.0001)	0.0014(0.0001)	-0.0056(0.0001)	-0.0114(0.0004)	0.0089(0.0003)
${\nu}_{69}(0.3937)$	-0.0084(0.0002)	0.0002(0.0001)	-0.0319(0.0033)	-0.0044(0.0001)	-0.0026(0.0001)	0.0005(0.0001)
$\nu_{72}(0.3949)$	0.0119(0.0005)	0.0173(0.0010)	0.0077(0.0002)	0.0147(0.0007)	0.0136(0.0006)	0.0205(0.0013)

Table S9: Linear interstate coupling parameters (λ) for triplet electronic states of **P** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength $(\lambda^2/2\omega^2)$ obtained for each vibrational mode is shown in paranthesis.

ibrational mode (Freq, eV)	$^{\lambda T_{1}-T_{2}}$	$\lambda T_1 - T_3$	$\lambda T_1 - T_4$	$\lambda T_{1} - T_{5}$	$\lambda_{T_2} - T_3$	$\lambda_{T_2} - T_5$	$\lambda_{T_2} - T_6$	$\lambda_{T_3} - T_4$	$\lambda T_3 - T_5$	$\lambda T_3 - T_6$	$\lambda T_4 - T_5$	$\lambda T_4 - T_6$	$\lambda T_5 - T_6$
$\nu_6(0.0446)$		0.0272(0.1860)								0.0120(0.0362)	0.0083 (0.0173)		
$\nu_{9}(0.0574)$	0.0308(0.1440)		0.0318(0.1535)	'			0.0210(0.0669)	'	0.0340(0.1754)	'		0.0185 (0.0519)	'
$\nu_{11}(0.0629)$					0.0099 (0.0124)								0.0139 (0.0244
$\nu_{12}(0.0631)$	0.0400(0.2009)		0.0405(0.2060)				0.0222(0.0619)		0.0087 (0.0095)			0.0190(0.0453)	
$\nu_{15}(0.0687)$		0.0234(0.0580)		,		0.0069 (0.0050)					0.0085 (0.0077)		,
$\nu_{19}(0.0873)$					0.0260(0.0443)								0.0131 (0.0113
$\nu_{21}(0.0929)$							0.0118(0.0081)					0.0102 (0.0060)	
$\nu_{26}(0.1035)$								0.0133(0.0083)					0.0197 (0.0181
$\nu_{33}(0.1216)$						0.0298 (0.0300)				0.0177(0.0106)	0.0176(0.0105)		
$\nu_{36}(0.1258)$					0.0348(0.0383)								0.0219 (0.0152
$\nu_{38}(0.1381)$					0.0068 (0.0012)			0.0065(0.0011)					0.0275 (0.0198
$\nu_{39}(0.1397)$	0.0505(0.0653)		0.0301 (0.0232)				0.0315(0.0254)		0.0540(0.0747)			0.0326(0.0272)	,
$\nu_{40}(0.1445)$										0.0298(0.0213)			
$ u_{42}(0.1486) $	0.0435(0.0428)		0.0509 (0.0587)				0.0316(0.0226)					0.0239 (0.0129)	
$ u_{43}(0.1493) $						$0.0481 \ (0.0519)$				0.0313(0.0220)	0.0273 (0.0167)		
$\nu_{44}(0.1528)$						0.0458(0.0449)				0.0344(0.0253)	0.0196(0.0082)		
$ u_{46}(0.1567) $			0.0181 (0.0067)				0.0150(0.0046)		0.0186 (0.0070)				
$ u_{47}(0.1573) $					0.0475(0.0456)								0.0077 (0.0012
$\nu_{48}(0.1665)$,	,			,	,	0.0345(0.0215)	,		,
$\nu_{50}(0.1736)$	0.0850(0.1199)		0.0992 (0.1633)				0.0503(0.0420)		0.0844(0.1182)			$0.0364 \ (0.0220)$	
$ u_{52}(0.1778) $	0.0228(0.0082)		0.0121(0.0023)				0.0152(0.0037)		(0.0077) (0.0009)			0.0165(0.0043)	
$\nu_{53}(0.1807)$		0.0873(0.1167)				0.0319 (0.0156)					0.0292 (0.0131)		
$\nu_{54}(0.1810)$					0.0227 (0.0079)			0.0034(0.0002)					0.0187 (0.0053
$\nu_{55}(0.1839)$					0.0674(0.0672)			-					0.0344 (0.0175
$\nu_{56}(0.1879)$		0.1481(0.3106)				0.0678 (0.0651)					0.0387 (0.0212)		
$\nu_{57}(0.1904)$	0.0307(0.0130)		0.0463(0.0296)				0.0226(0.0070)		0.0227 (0.0071)			0.0101 (0.0014)	
$\nu_{59}(0.2016)$	0.1371(0.2312)		0.1465(0.2640)				0.0914(0.1028)		0.1416(0.2467)			0.0751 (0.0694)	
$\nu_{60}(0.2028)$					0.0337 (0.0138)								0.0635 (0.0490
$ u_{61}(0.2041) $		0.0692(0.0575)				$0.0771 \ (0.0713)$				0.0627(0.0472)			
$\nu_{63}(0.3913)$,				0.0033(0.0001)					0.0018 (0.0001
$\nu_{64}(0.3913)$	0.0130(0.0006)		0.0099 (0.0003)				0.0043(0.0001)		0.0128(0.0005)			0.0061 (0.0001)	
$\nu_{66}(0.3918)$								0.0020(0.0001)					0.0005 (0.0001
$\nu_{67}(0.3927)$		0.0136(0.0006)				0.0059 (0.0001)					0.0047 (0.0001)		'
$\nu_{68}(0.3928)$	0.0135(0.0006)		,	,	,		0.0073(0.0002)	,	,	,	,	0.0119(0.0005)	,
$\nu_{70}(0.3937)$,	,	,			,	,	0.0118(0.0004)	0.0042 (0.0001)		,
(0.3948)	,	,	,	,	0.0040 (0.0001)	1	,		1	,	,	1	0.0056 (0.0001

Table S10: Linear intrastate coupling parameters (κ) for singlet electronic states of **AP2** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength ($\kappa^2/2\omega^2$) obtained for each vibrational mode is shown in parameters.

A mode	κ^{S_1}	κ^{S_2}	κ^{S_3}	κ^{S_4}	κ^{S_5}	κ^{S_6}
(Freq, eV)						
$\nu_1(0.0060)$	0.0141(2.7613)	0.0243(8.2013)	0.0361(18.0946)	0.0233(7.5452)	0.0140(2.7296)	0.0069(0.6594)
$\nu_{3}(0.0077)$	0.0024(0.0486)	0.0124(1.2967)	0.0254(5.4433)	0.0137(1.5772)	0.0147(1.8321)	0.0105(0.9226)
$\nu_6(0.0181)$	-0.0029(0.0128)	-0.0003(0.0001)	0.0043(0.0289)	0.0075(0.0862)	0.0046(0.0324)	0.0001(0.0001)
$\nu_7(0.0208)$	0.0026(0.0078)	0.0148(0.2531)	0.0194(0.4347)	0.0093(0.0993)	0.0035(0.0145)	0.0022(0.0056)
$\nu_{10}(0.0233)$	0.0038(0.0133)	-0.0008(0.0006)	-0.0019(0.0034)	-0.0038(0.0132)	-0.0126(0.1459)	-0.0152(0.2133)
$\nu_{12}(0.0331)$	0.0059(0.0159)	-0.0009(0.0004)	-0.0127(0.0738)	-0.0004(0.0001)	0.0020(0.0018)	0.0078(0.0278)
$\nu_{15}(0.0383)$	0.0105(0.0376)	-0.0036(0.0044)	-0.0002(0.0001)	0.0078(0.0210)	0.0200(0.1364)	0.0181(0.1112)
$\nu_{17}(0.0453)$	-0.0144(0.0505)	-0.0072(0.0126)	-0.0136(0.0452)	-0.0055(0.0073)	-0.0298(0.2159)	-0.0234(0.1334)
$\nu_{18}(0.0526)$	-0.0232(0.0973)	-0.0113(0.0231)	-0.0024(0.0011)	0.0020(0.0007)	-0.0317(0.1813)	-0.0283(0.1448)
$\nu_{20}(0.0601)$	0.0068(0.0064)	0.0118(0.0193)	0.0174(0.0421)	-0.0104(0.0148)	0.0134(0.0247)	0.0130(0.0235)
$\nu_{24}(0.0661)$	0.0085(0.0083)	-0.0031(0.0011)	-0.0129(0.0192)	-0.0201(0.0464)	-0.0029(0.0010)	0.0024(0.0006)
$\nu_{26}(0.0689)$	0.0061(0.0039)	0.0035(0.0013)	0.0063(0.0042)	-0.0161(0.0273)	-0.0026(0.0007)	-0.0061(0.0039)
$\nu_{28}(0.0733)$	-0.0040(0.0015)	0.0164(0.0250)	0.0318(0.0942)	-0.0053(0.0026)	-0.0178(0.0295)	-0.0260(0.0628)
$\nu_{30}(0.0802)$	-0.0005(0.0001)	0.0106(0.0087)	0.0025(0.0005)	-0.0030(0.0007)	-0.0089(0.0061)	-0.0125(0.0121)
$\nu_{32}(0.0822)$	0.0078(0.0045)	0.0306(0.0693)	0.0417(0.1285)	0.0292(0.0629)	0.0232(0.0398)	0.0204(0.0309)
$\nu_{34}(0.0877)$	0.0113(0.0083)	0.0182(0.0215)	0.0152(0.0149)	0.0076(0.0037)	0.0183(0.0219)	-0.0123(0.0099)
$\nu_{35}(0.0892)$	0.0005(0.0001)	0.0076(0.0036)	0.0097(0.0060)	-0.0019(0.0002)	0.0070(0.0031)	-0.0014(0.0001)
$\nu_{38}(0.1026)$	0.0015(0.0001)	-0.0036(0.0006)	0.0072(0.0025)	0.0078(0.0029)	0.0036(0.0006)	0.0072(0.0024)
$\nu_{40}(0.1031)$	0.0136(0.0087)	-0.0066(0.0020)	-0.0004(0.0001)	0.0027(0.0003)	0.0199(0.0185)	-0.0121(0.0068)
$\nu_{43}(0.1074)$	0.0008(0.0001)	0.0114(0.0056)	0.0138(0.0082)	0.0160(0.0112)	0.0503(0.1096)	0.0330(0.0471)
$\nu_{44}(0.1138)$	-0.0063(0.0015)	0.0002(0.0001)	-0.0001(0.0001)	-0.0025(0.0002)	-0.0023(0.0002)	-0.0003(0.0001)
$\nu_{46}(0.1210)$	0.0064(0.0014)	0.0058(0.0011)	0.0144(0.0071)	0.0078(0.0021)	0.0187(0.0120)	0.0062(0.0013)
$\nu_{48}(0.1224)$	0.0013(0.0001)	0.0063(0.0013)	0.0050(0.0008)	0.0008(0.0001)	0.0108(0.0039)	0.0114(0.0043)
$\nu_{52}(0.1282)$	-0.0158(0.0076)	-0.0167(0.0085)	-0.0089(0.0024)	0.0005(0.0001)	-0.0074(0.0017)	-0.0059(0.0010)
$\nu_{54}(0.1314)$	0.0017(0.0001)	-0.0125(0.0045)	-0.0173(0.0086)	-0.0066(0.0013)	0.0118(0.0040)	0.0224(0.0145)
$\nu_{55}(0.1369)$	-0.0173(0.0080)	0.0024(0.0002)	0.0162(0.0070)	-0.0200(0.0107)	-0.0026(0.0002)	-0.0065(0.0011)
$\nu_{57}(0.1446)$	-0.0354(0.0300)	0.0125(0.0037)	0.0279(0.0186)	0.0059(0.0008)	-0.0092(0.0020)	-0.0152(0.0055)
$\nu_{59}(0.1480)$	0.0050(0.0006)	0.0145(0.0048)	0.0204(0.0095)	-0.0004(0.0001)	-0.0280(0.0179)	-0.0242(0.0133)
$\nu_{64}(0.1574)$	0.0963(0.1872)	0.0951(0.1825)	0.1076(0.2336)	0.0905(0.1654)	0.0690(0.0962)	0.0678(0.0928)
$\nu_{65}(0.1584)$	0.0201(0.0081)	0.0497(0.0492)	0.0669(0.0893)	0.0302(0.0181)	0.0317(0.0201)	0.0390(0.0302)
$\nu_{67}(0.1694)$	-0.0048(0.0004)	-0.0066(0.0008)	-0.0355(0.0219)	-0.0005(0.0001)	0.0288(0.0144)	0.0298(0.0155)
$\nu_{68}(0.1718)$	-0.0298(0.0150)	-0.0416(0.0293)	-0.0451(0.0345)	-0.0352(0.0210)	0.0154(0.0040)	0.0033(0.0002)
$\nu_{70}(0.1727)$	-0.0559(0.0524)	-0.0112(0.0021)	0.0164(0.0045)	-0.0397(0.0265)	0.0072(0.0009)	-0.0129(0.0028)
$\nu_{73}(0.1790)$	0.0316(0.0156)	0.0304(0.0144)	0.0543(0.0459)	0.0290(0.0132)	0.0397(0.0246)	0.0015(0.0001)
$\nu_{76}(0.1829)$	0.0011(0.0001)	0.0081(0.0010)	0.0159(0.0038)	0.0093(0.0013)	0.0099(0.0015)	-0.0056(0.0005)
$\nu_{78}(0.1840)$	-0.0098(0.0014)	-0.0205(0.0062)	-0.0309(0.0141)	-0.0122(0.0022)	-0.0117(0.0020)	0.0122(0.0022)
$\nu_{79}(0.1847)$	-0.0098(0.0014)	0.0112(0.0018)	0.0096(0.0013)	0.0025(0.0001)	-0.0251(0.0092)	0.0099(0.0014)
$\nu_{82}(0.1926)$	0.0401(0.0217)	0.0256(0.0088)	0.0411(0.0227)	-0.0199(0.0053)	0.0016(0.0001)	-0.0108(0.0016)
$\nu_{84}(0.2012)$	0.0328(0.0133)	0.0319(0.0126)	0.0348(0.0150)	0.0291(0.0104)	0.0560(0.0387)	0.0231(0.0066)
$\nu_{86}(0.2065)$	-0.1260(0.1862)	-0.0558(0.0365)	-0.0779(0.0712)	-0.0079(0.0007)	-0.1370(0.2202)	-0.1481(0.2572)
$\nu_{88}(0.2177)$	-0.0525(0.0291)	-0.1020(0.1098)	-0.1503(0.2384)	-0.0500(0.0264)	-0.0507(0.0272)	-0.0496(0.0260)
$\nu_{90}(0.3765)$	0.0077(0.0002)	-0.0035(0.0001)	-0.0025(0.0001)	0.0023(0.0001)	0.0092(0.0003)	0.0085(0.0003)
$\nu_{91}(0.3847)$	0.0003(0.0001)	-0.0005(0.0001)	-0.0009(0.0001)	0.0001(0.0001)	-0.0018(0.0001)	-0.0027(0.0001)
$\nu_{94}(0.3889)$	-0.0006(0.0001)	0.0086(0.0002)	0.0096(0.0003)	0.0012(0.0001)	-0.0015(0.0001)	0.0010(0.0001)
$\nu_{95}(0.3922)$	0.0006(0.0001)	0.0026(0.0001)	0.0019(0.0001)	0.0020(0.0001)	0.0018(0.0001)	0.0034(0.0001)
$\nu_{97}(0.3929)$	-0.0072(0.0002)	-0.0042(0.0001)	-0.0038(0.0001)	-0.0055(0.0001)	-0.0121(0.0005)	-0.0067(0.0001)
$\nu_{99}(0.3954)$	0.0041(0.0001)	0.0009(0.0001)	-0.0004(0.0001)	0.0068(0.0001)	0.0057(0.0001)	0.0045(0.0001)
$\nu_{100}(0.3983)$	-0.0021(0.0001)	-0.0031(0.0001)	-0.0016(0.0001)	-0.0049(0.0001)	-0.0032(0.0001)	-0.0025(0.0001)
$\nu_{102}(0.3999)$	-0.0011(0.0001)	0.0011(0.0001)	0.0023(0.0001)	-0.0015(0.0001)	-0.0039(0.0001)	-0.0064(0.0001)

Table S11: Linear interstate coupling parameters (λ) for singlet electronic states of **AP2** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength $(\lambda^2/2\omega^2)$ obtained for each vibrational mode is shown in paranthesis.

B mode	$\lambda_{S_1-S_2}$	$\lambda_{S_1-S_4}$	$\lambda_{S_1-S_5}$	$\lambda_{S_1-S_6}$	$^{\lambda S_2 - S_3}$	$\lambda S_3 - S_4$	$\lambda_{S_3-S_5}$	$\lambda_{S_3-S_6}$
(Freq, eV)								
$\nu_2(0.0062)$	0.0018(0.0421)	0.0383(19.0803)	0.0043(0.2405)			0.0096(1.1988)	0.0505(33.1718)	0.0516(34.6327)
$\nu_4(0.0080)$	0.0083(0.5382)	0.0326(8.3028)	0.0218(3.7128)	0.0183(2.6163)		0.0063(0.3101)	0.0359(10.0688)	0.0395(12.1895)
$\nu_{5}(0.0156)$	0.0067(0.0922)	0.0451(4.1790)	I			0.0119(0.2909)	0.0556(6.3514)	0.0644(8.5210)
$\nu_8(0.0214)$	0.0084(0.0770)	0.0365(1.4545)	I			0.0077(0.0647)	(1790.1)7150.0	0.0338(1.2473)
$\nu_{9}(0.0217)$	0.0026(0.0072)	0.0547(3.1771)		1		0.0153(0.2486)	0.0658(4.5973)	0.0753(6.0206)
$\nu_{11}(0.0285)$	0.0078(0.0375)	0.0364(0.8156)	0.0255(0.4003)	0.0131(0.1056)		0.0079(0.0384)	0.0457(1.2856)	0.0487(1.4600)
$\nu_{13}(0.0336)$	0.0120(0.0638)	0.0558(1.3790)		0.0047(0.0098)		0.0153(0.1037)	0.0624(1.7245)	0.0732(2.3731)
$\nu_{14}(0.0372)$	0.0062(0.0139)	0.0362(0.4735)	0.0256(0.2368)	0.0211(0.1609)		0.0070(0.0177)	0.0386(0.5383)	0.0418(0.6313)
$\nu_{16}(0.0429)$	0.0199(0.1076)	0.0266(0.1922)	0.0409(0.4545)	0.0404(0.4434)		0.0012(0.0004)	0.0083(0.0187)	
$\nu_{19}(0.0538)$	0.0144(0.0358)	0.0291(0.1463)	0.0285(0.1403)	0.0192(0.1403)		0.0038(0.0025)	0.0195(0.0657)	0.0129(00287)
$\nu_{21}(0.0609)$	0.0109(0.0160)	0.0356(0.1709)				0.0076(0.0078)	0.0386(0.2009)	0.0407(0.2233)
$\nu_{22}(0.0631)$	0.0092(0.0106)	0.0159(0.0317)	0.0217(0.0591)			0.0003(0.0001)	I	ı
$\nu_{23}(0.0635)$	0.0110(0.0150)	0.0188(0.0438)			0.0105(0.0137)			ı
$\nu_{25}(0.0662)$	0.0157(0.0281)	0.0623(0.4428)	0.0305(0.1061)	0.0255(.0742)		0.0167(0.0318)	0.0667(0.5076)	0.0748(0.6383)
$\nu_{27}(0.0699)$	0.0069(0.0049)	0.0732(0.5483)	0.0242(0.0599)	0.0238(0.0580)		0.0253(0.0655)	0.0920(0.8661)	0.1057(1.1433)
$\nu_{29}(0.0777)$	0.0079(0.0052)	0.0560(0.2597)	0.0269(0.0599)	0.0152(0.0191)		0.0153(0.0194)	0.0671(0.3729)	0.0745(0.4597)
$\nu_{31}(0.0810)$		0.0015(0.0002)			0.0136(0.0141)			
$\nu_{33}(0.0877)$	0.0033(0.0007)	0.0286(0.0532)	0.0169(0.0186)	0.0047(0.0014)	. 1	0.0056(0.0020)	0.0346(0.0778)	0.0377(0.0924)
$\nu_{36}(0.0910)$. 1	0.0230(0.0319)	. 1	. 1		0.0051(0.0016)	0.0314(0.0595)	0.0240(0.0348)
$\nu_{37}(0.0956)$	0.0094(0.0048)	0.0237(0.0307)	0.0231(0.0292)	0.0142(0.0110)	,	0.0031(0.0005)	0.0177(0.0171)	0.0118(0.0076)
$\nu_{3a}(0.1030)$	0.0119(0.0067)	0.0191(0.0172)	. 1	. 1	,	(0.0009(0.0001))	. 1	. 1
$\nu_{A1}(0.1045)$. 1	0.0260(0.0310)	0.0255(0.0298)	0.0297(0.0404)	0.0094(0.0040)	0.0034(0.0005)	0.0200(0.0183)	0.0246(0.0277)
$\nu_{A9}(0.1062)$	0.0090(0.0036)	0.0100(0.0044)	0.0181(0.0145)	0.0095(0.0040)	, 1	, 1	~ 1	, 1
$\nu_{AE}(0.1180)$	0.0135(0.0065)	0.0454(0.0740)	0.0222(0.0177)	0.0181(0.0118)		0.0109(0.0043)	0.0528(0.1001)	0.0595(0.1271)
$\nu_{47}(0.1216)$	0.0081(0.0022)	0.0113(0.0043)				0.0001 (0.0001)		
$\nu_{A0}(0.1231)$	0.0060(0.0012)	0.0026(0.0002)				0.0008(0.0001)	0.0076(0.0019)	1
49(11230)	0 0109(0 0034)	0.0208(0.0141)	0.0174(0.0090)	0.0126(0.0052)	1	0.0039(0.0003)	0.0216(0.0152)	0 0222(0 0161)
v50(0:1269)	0.000701000	0.0209(0.0404)	(9900,0)#110.0	0.0230(0.0166)		0.0069(0.0015)	0.0396(0.0492)	0.0419(0.0550)
(6071.0) IG4		0.0165(0.0082)	(L070.0)0070.0	(00T0:0)0070:0		0.0036(0.0004)	0.0275(0.0228)	
V53(0.1209)	(1000.0)0200.0	(70000)0010000		- 0.0199/0.000		0.0051(0.0007)	0.0279(0.0126)	(92200)012000 0 0331(0 0378)
V56(0.1400)	I	0.0245(0.02045)	12200 076910 0	(00000)0710.0		0.0000(0.0015)	0.0120(0.0120)	
$\nu_{58}(0.1470)$	I	0.0345(0.0275)	0.0183(0.0077)			0.0080(0.0015)	0.0463(0.0496)	0.0493(0.0562)
$\nu_{60}(0.1488)$	I	0.0511(0.0590)	0.0331(0.0247)	0.0324(0.0237)		0.0130(0.0038)	0.0629(0.0893)	0.0713(0.1148)
$\nu_{61}(0.1502)$	ı	0.0634(0.0890)	0.0086(0.0016)	1		0.0204(0.0092)	0.0811(0.1458)	0.0923(0.1888)
$\nu_{62}(0.1541)$	1	0.0869(0.1590)	0.0240(0.0121)	0.0249(0.0131)	,	0.0300(0.0189)	0.0933(0.1833)	0.1074(0.2429)
$\nu_{63}(0.1556)$		0.0672(0.0933)	0.0129(0.0034)	0.0175(0.0063)		0.0203(0.0085)	0.0756(0.1180)	0.0877(0.1588)
$\nu_{66}(0.1659)$		0.0348(0.0220)				0.0082(0.0012)	0.0394(0.0282)	0.0429(.0334)
$\nu_{69}(0.1719)$	I	0.0665(0.0748)			,	0.0210(0.0075)	0.0794(0.1067)	0.0907(0.1392)
$\nu_{71}(0.1730)$	0.0229(0.0088)	0.0663(0.0734)		0.0392(0.0257)		0.0149(0.0037)	0.0484(0.0391)	0.0571(0.0545)
$\nu_{72}(0.1751)$	0.0105(0.0018)	0.0370(0.0224)	0.0341(0.0189)	0.0456(0.0339)		0.0063(0.0006)	0.0356(0.0207)	0.0466(0.0354)
$\nu_{74}(0.1793)$	0.0026(0.0001)	0.0174(0.0047)	0.0216(0.0072)	0.0176(0.0048)		0.0027(0.0001)	0.0228(0.0081)	0.0229(0.0081)
$\nu_{75}(0.1828)$	1	0.0334(0.0167)	0.0158(0.0037)	0.0136(0.0028)		0.0076(0.0009)	0.0444(0.0295)	0.0506(0.0384)
$\nu_{77}(0.1839)$	I	0.0401(0.0237)	0.0152(0.0034)	0.0142(0.0030)	,	0.0097(0.0014)	0.0508(0.0382)	0.0583(0.0503)
$\nu_{80}(0.1880)$	0.0055(0.0004)	0.0433(0.0265)	0.0592(0.0496)	0.0577(0.0471)		0.0084(0.0010)	0.0579(0.0474)	0.0620(0.0544)
$\nu_{81}(0.1909)$	I	0.0598(0.0490)	0.0324(0.0144)	0.0317(0.0138)	,	0.0159(0.0035)	0.0668(0.0612)	0.0759(0.0789)
$\nu_{83}(0.2003)$	0.0304(0.0115)	0.0911(0.1033)	0.0719(0.0645)	0.0768(0.0736)		0.0234(0.0068)	0.0729(0.0663)	0.0828(0.0854)
$\nu_{85}(0.2040)$	0.0045(0.0002)	0.0486(0.0284)	0.0320(0.0123)	0.0511(0.0314)		0.0098(0.0012)	0.0429(0.0221)	0.0587(0.0415)
$\nu_{87}(0.2172)$		0.1243(0.1637)	0.0827(0.0726)	0.0733(0.0570)	0.0174(0.0032)	0.0432(0.0198)	0.1098(0.1277)	0.1169(0.1449)
$\nu_{89}(0.3765)$	0.0036(0.0001)	0.0157(0.0009)				0.0023(0.0001)	0.0136(0.0006)	0.0080(0.0002)
$\nu_{92}(0.3847)$	0.0038(0.0001)	0.0105(0.0004)				0.0011(0.0001)		
$\nu_{93}(0.3889)$	0.0060(0.0001)	0.0205(0.0014)	0.0097(0.0003)	1	,	0.0030(0.0001)	0.0154(0.0008)	0.0167(0.0009)
$\nu_{96(0.3927)}$	ı	0.0026(0.0001)	0.0153(0.0008)	0.0172(0.0010)		0.0006(0.0001)	0.0113(0.0004)	0.0133(0.0006)
$\nu_{98}(0.3933)$		0.0040(0.0001)	0.0134(0.0006)	0.0071(0.0002)		0.0009(0.0001)	0.0115(0.0004)	0.0108(0.0004)
ν_{101} (0.3999)	-	0.0053(0.0001)	0.0187(0.0010)	0.0148(0.0007)		0.00008(0.0000	0.01772(0.0000)	0.0138(0.0000)

Table S12: Linear intrastate coupling parameters (κ) for triplet electronic states of **AP2** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength ($\kappa^2/2\omega^2$) obtained for each vibrational mode is shown in parameters.

$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	A mode	κ^{T_1}	κ^{T_2}	κ^{T_3}	κ^{T_4}	κ^{T_5}	κ^{T_6}
	(Freq, eV)						
$\begin{split} \mathbf{p}_{0}(0.077) & 0.0061(0.318) & 0.0141(7.298) & 0.0176(2.0122) & 0.0182(7.394) & 0.0077(0.5007) & 0.0112(0.1080) \\ \mathbf{p}_{10}(0.0128) & 0.0061(0.012) & 0.0036(0.1110) & 0.0117(0.1382) & 0.0086(0.006) & 0.0007(0.007) & 0.0111 \\ \mathbf{p}_{10}(0.0233) & 0.0043(0.0100) & 0.0036(0.0110) & 0.0117(0.1382) & 0.0086(0.006) & 0.0059(0.0031) & 0.0036(0.008) \\ \mathbf{p}_{11}(0.0333) & 0.0020(0.0030) & 0.0100(0.0456) & 0.0023(0.0021) & 0.0039(0.0060) & 0.0090(0.0031) & 0.0036(0.008) \\ \mathbf{p}_{11}(0.0333) & 0.0220(1.160) & -0.013(0.0135) & 0.0026(0.0133) & 0.0075(0.0129) & 0.0290(1.150) & 0.0138(0.0439) \\ \mathbf{p}_{11}(0.0433) & 0.0220(1.060) & -0.013(0.0133) & -0.0050(0.0063) & 0.0121(0.026) & -0.0240(0.111) & -0.0181(0.0133) \\ \mathbf{p}_{10}(0.0601) & 0.016(0.0010) & 0.0077(0.0008) & 0.0023(0.012) & -0.0226(0.133) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.103) & -0.0221(0.003) & -0.0$	$\nu_1(0.0060)$	0.0135(2.5313)	0.0194(5.2272)	0.0269(10.0501)	0.0303(12.7513)	0.0072(0.7200)	0.0038(0.2006)
$ \begin{array}{c} \mu_{\alpha}(0.0181) & -0.042(0.029) & -0.066(0.0382) & 0.049(0.0366) & -0.066(0.0513) & -0.007(0.0007) & 0.0111(0.1580) \\ \mu_{10}(0.023) & 0.0013(0.0170) & -0.063(0.0100) & -0.0000(0.0322) & -0.0008(0.0066) & -0.0050(0.021) & -0.0033(0.0649) \\ \mu_{21}(0.0331) & -0.008(0.0103) & -0.0110(0.0456) & 0.0022(0.0024) & -0.0039(0.0066) & -0.0039(0.0104) & -0.0033(0.0649) \\ \mu_{21}(0.0331) & -0.0201(0.1660) & -0.0113(0.0433) & -0.0050(0.0153) & -0.0291(0.1630) & -0.0291(0.1521) & -0.0138(0.0484) \\ \mu_{21}(0.0433) & -0.024(0.1103) & -0.0032(0.0021) & -0.0051(0.0033) & -0.0291(0.1522) & -0.0248(0.1111) \\ \mu_{22}(0.0601) & 0.008(0.0137) & -0.0089(0.0143) & -0.0050(0.0153) & -0.0291(0.152) & -0.0248(0.1111) \\ \mu_{22}(0.0601) & 0.0091(0.0011) & 0.0077(0.0008) & -0.0132(0.0121) & -0.0072(0.0008) & -0.0132(0.0113) & -0.0138(0.0444) \\ \mu_{22}(0.028) & 0.0041(0.0011) & 0.0077(0.0012) & -0.0322(0.0121) & -0.0221(0.0113) & -0.0131(0.0141) \\ \mu_{22}(0.028) & -0.0092(0.0005) & 0.0157(0.0157) & -0.0322(0.0006) & -0.0132(0.0011) & -0.0044(0.0074) \\ \mu_{22}(0.073) & -0.0097(0.0001) & 0.0139(0.0117) & -0.022(0.0006) & -0.0132(0.0011) & -0.0148(0.017) \\ \mu_{23}(0.082) & -0.0067(0.0001) & 0.0267(0.0012) & -0.0322(0.0006) & -0.0132(0.0011) & -0.0042(0.0001) \\ \mu_{23}(0.082) & -0.0067(0.0001) & 0.0267(0.0001) & -0.0132(0.0011) & -0.0022(0.0003) & -0.033(0.0003) \\ \mu_{33}(0.087) & 0.007(0.0001) & 0.0269(0.0055) & -0.033(0.0000) & -0.0132(0.0011) & -0.0023(0.0003) \\ \mu_{34}(0.1024) & 0.007(0.0003) & -0.067(0.0012) & 0.0097(0.0001) & 0.0042(0.0011) & -0.0022(0.0003) & 0.0022(0.0003) \\ \mu_{34}(0.1024) & 0.007(0.0003) & -0.067(0.0012) & 0.0097(0.0001) & 0.0042(0.0011) & -0.0022(0.0003) & 0.0022(0.0001) \\ \mu_{34}(0.124) & 0.007(0.0003) & -0.067(0.0011) & 0.0097(0.0001) & 0.0022(0.0001) & -0.032(0.0002) & 0.0022(0.0001) \\ \mu_{34}(0.124) & 0.007(0.0002) & -0.0223(0.0121) & 0.0097(0.0001) & 0.0032(0.0002) & 0.0222(0.0121) & -0.0328(0.0033) & 0.0493(0.0002) \\ \mu_{34}(0.124) & 0.007(0.0002) & -0.0292(0.0013) & 0.0097(0.0001) & 0.0038(0.0003) & 0.0110(0.0033) & 0.010$	$\nu_3(0.0077)$	0.0061(0.3138)	0.0143(1.7245)	0.0176(2.6122)	0.0182(2.7934)	0.0077(0.5000)	0.0012(0.0121)
$ \begin{array}{c} & \psi_{1}(0.223) \\ & \psi_{10}(0.233) \\ & \psi_{12}(0.331) \\ & \psi_{12}(0.331) \\ & \psi_{12}(0.331) \\ & \psi_{12}(0.331) \\ & \psi_{12}(0.333) \\ & \psi_{12}(0.33) \\ & \psi_{12}(0.333) \\ & \psi_{1$	$\nu_6(0.0181)$	-0.0042(0.0269)	-0.0050(0.0382)	0.0049(0.0366)	0.0058(0.0513)	-0.0007(0.0007)	0.0111(0.1880)
$ \begin{array}{c} \nu_{10}(0,0233) & 0.0043(0.0170) & -0.0033(0.0100) & -0.0009(0.0332) & -0.0039(0.0096) & -0.0039(0.0321) & -0.0033(0.0059) \\ \nu_{12}(0.0333) & -0.204(0.1460) & -0.013(0.0133) & -0.0098(0.0154) & -0.0037(0.0096) & 0.0029(0.0169) & -0.0138(0.0059) \\ \nu_{12}(0.0433) & -0.024(0.1460) & -0.013(0.0133) & -0.0024(0.0101) & -0.0051(0.0033) & -0.0249(0.1511) & -0.0118(0.0339) \\ \nu_{16}(0.0526) & -0.039(0.2077) & -0.0898(0.0154) & -0.0025(0.0013) & -0.0224(0.1511) & -0.0118(0.0339) \\ \nu_{20}(0.0661) & 0.0094(0.0101) & 0.0077(0.0089) & -0.0137(0.0145) & -0.0121(0.0245) & -0.0224(0.1511) \\ \nu_{20}(0.0661) & 0.0094(0.0111) & 0.0077(0.0089) & -0.0137(0.0145) & -0.0131(0.0165) & -0.0141(0.0141) \\ \nu_{20}(0.0689) & 0.0074(0.0081) & -0.0133(0.0157) & -0.0325(0.0006) & -0.0133(0.0165) & -0.0134(0.0167) \\ \nu_{20}(0.0873) & -0.0077(0.0091) & 0.0007(0.0091) & -0.0130(0.017) & -0.0025(0.0006) & -0.0133(0.0165) & -0.0134(0.0167) \\ \nu_{20}(0.0877) & 0.0100(0.0065) & 0.0174(0.0197) & -0.0330(0.0005) & -0.0171(0.0166) & 0.0074(0.0094) & 0.0138(0.0197) \\ \nu_{20}(0.0877) & 0.0100(0.0065) & 0.0174(0.0197) & 0.0138(0.0127) & -0.0032(0.0001) & -0.0025(0.00091) & 0.0027(0.0098) & 0.0122(0.0007) \\ \nu_{20}(0.0282) & -0.0005(0.0001) & 0.0057(0.0005) & 0.0037(0.0005) & 0.0037(0.0005) & 0.0027(0.0009) & 0.0221(0.0003) \\ \nu_{20}(0.128) & -0.0031(0.0001) & 0.0057(0.0001) & 0.0094(0.0021) & -0.0081(0.0002) & 0.0122(0.0003) \\ \nu_{20}(0.128) & -0.0033(0.0000) & 0.0037(0.0001) & 0.0094(0.0001) & -0.0031(0.0002) & 0.0123(0.0003) \\ \nu_{20}(0.128) & -0.0033(0.0000) & 0.0037(0.0001) & 0.0094(0.0001) & -0.0031(0.0001) \\ \nu_{20}(0.128) & -0.0032(0.0001) & 0.0037(0.0001) & 0.0034(0.0003) & 0.0031(0.0002) & 0.0013(0.0002) \\ \nu_{20}(0.128) & -0.0033(0.0000) & 0.0037(0.0001) & 0.0034(0.0003) & 0.0034(0.0003) & -0.0033(0.0002) \\ \nu_{20}(0.128) & -0.0133(0.0001) & 0.0032(0.0001) & 0.0031(0.0001) & -0.0033(0.0002) & -0.0133(0.0001) \\ \nu_{20}(0.138) & -0.033(0.0001) & 0.0032(0.0001) & 0.0031(0.0001) & -0.0033(0.0002) & -0.0133(0.0002) \\ \nu_{20}(0.138) & -0.033(0.0001) & 0.0033($	$\nu_7(0.0208)$	0.0010(0.0012)	0.0098(0.1110)	0.0117(0.1582)	0.0114(0.1502)	0.0006(0.0004)	0.0006(0.0004)
$ \begin{array}{c} \mu_{12}(0.031) & -0.008(0.003) & 0.0190(0.056) & 0.0023(0.0024) & -0.0370(0.069) & 0.0029(0.1648) & 0.0330(0.059) \\ \mu_{12}(0.0433) & -0.0220(0.163) & -0.0113(0.0133) & -0.0068(0.0138) & -0.0075(0.0192) & -0.029(0.148) & -0.013(0.069) \\ \mu_{12}(0.0526) & -0.0330(0.2077) & -0.0089(0.0143) & -0.0051(0.0083) & -0.0240(0.151) & -0.0114(0.0532) \\ \mu_{23}(0.0561) & 0.0094(0.0111) & 0.0027(0.0085) & -0.0032(0.0021) & -0.0328(0.1231) & -0.0027(0.0088) & 0.0124(0.0211) \\ \mu_{23}(0.0569) & 0.0094(0.0111) & 0.0027(0.0085) & -0.0150(0.0247) & -0.0022(0.0006) & -0.0133(0.0157) \\ \mu_{23}(0.059) & 0.0094(0.0011) & 0.0027(0.0085) & -0.0130(0.0177) & -0.0022(0.0008) & -0.0133(0.0157) \\ \mu_{23}(0.0522) & -0.0028(0.0051) & 0.0032(0.0012) & -0.0025(0.0071) & 0.0022(0.0038) & 0.0131(0.0117) \\ \mu_{23}(0.0822) & -0.0066(0.0001) & 0.035(0.0125) & -0.0138(0.0124) & 0.0042(0.0011) & -0.0068(0.0011) \\ \mu_{23}(0.0822) & -0.0066(0.0001) & 0.0257(0.0056) & -0.033(0.0015) & -0.0338(0.0124) \\ \mu_{23}(0.0822) & -0.0066(0.0001) & 0.0257(0.0056) & -0.033(0.0056) & -0.033(0.00167) \\ \mu_{23}(0.0822) & -0.0066(0.0011) & 0.0025(0.0052) & -0.0038(0.0006) & 0.0077(0.0016) & 0.0022(0.0018) \\ \mu_{23}(0.1031) & 0.0070(0.0023) & -0.0057(0.0015) & -0.008(0.0001) & -0.0051(0.0012) & 0.0118(0.0023) \\ \mu_{24}(0.1031) & 0.0070(0.0023) & -0.0057(0.0015) & -0.0036(0.0001) & -0.0051(0.0012) & 0.0118(0.0024) \\ \mu_{24}(0.1131) & 0.0070(0.0023) & -0.0037(0.0015) & -0.0018(0.0001) & 0.0040(0.001) & -0.0038(0.0026) \\ \mu_{24}(0.1210) & 0.0072(0.0011) & 0.02210(0.0001) & -0.0051(0.0012) & 0.0118(0.0043) & -0.0013(0.0001) \\ \mu_{24}(0.1210) & 0.0072(0.0011) & 0.0022(0.0011) & -0.0158(0.0013) & -0.0113(0.0015) & -0.0013(0.0001) \\ \mu_{24}(0.1210) & 0.0072(0.0011) & 0.0072(0.0011) & 0.0055(0.0003) & 0.0013(0.0001) \\ \mu_{24}(0.1210) & 0.057(0.0724) & -0.0033(0.0002) & -0.0110(0.0033) & -0.0013(0.0001) \\ \mu_{24}(0.1214) & -0.055(0.0079) & 0.0022(0.0011) & -0.0158(0.0076) & -0.0138(0.0151) & -0.0038(0.0025) \\ \mu_{24}(0.1244) & -0.057(0.0724) & -0.0232(0.0151) & -0.0138(0.0124) & 0.0138(0.0$	$\nu_{10}(0.0233)$	0.0043(0.0170)	-0.0033(0.0100)	-0.0060(0.0332)	-0.0008(0.0006)	-0.0059(0.0321)	-0.0083(0.0634)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{12}(0.0331)$	-0.0008(0.0003)	0.0100(0.0456)	0.0023(0.0024)	-0.0039(0.0069)	0.0009(0.0004)	0.0033(0.0050)
	$\nu_{15}(0.0383)$	0.0220(0.1650)	-0.0113(0.0435)	-0.0068(0.0158)	0.0075(0.0192)	0.0209(0.1489)	0.0138(0.0649)
	$\nu_{17}(0.0453)$	-0.0240(0.1403)	0.0033(0.0027)	-0.0024(0.0014)	-0.0051(0.0063)	-0.0249(0.1511)	-0.0118(0.0339)
$ \begin{array}{c} \nu_{21}(0.661) & 0.0168(0.6321) & 0.0076(0.0080) & 0.0176(0.6429) & -0.0171(0.045) & 0.0156(0.0337) & 0.0124(0.0213) \\ \nu_{23}(0.663) & 0.0094(0.011) & 0.0077(0.0008) & -0.0322(0.012) & -0.0326(0.0201) & -0.0027(0.0008) & 0.011(0.0141) \\ \nu_{23}(0.6733) & -0.0070(0.001) & 0.0070(0.001) & 0.0130(0.157) & -0.0025(0.006) & -0.0133(0.0165) & -0.0134(0.0167) \\ \nu_{24}(0.082) & -0.0026(0.0005) & 0.0155(0.0187) & 0.0032(0.0089) & -0.0117(0.0166) & 0.0224(0.0041) & 0.0136(0.0144) \\ \nu_{24}(0.0822) & -0.0006(0.0001) & 0.0265(0.0520) & 0.0119(0.0122) & 0.0222(0.0470) & 0.0222(0.038) & 0.0385(0.007) \\ \nu_{24}(0.0877) & 0.0100(0.0005) & 0.017(0.012) & 0.0032(0.0001) & -0.0030(0.0006) & 0.0097(0.0059) & 0.0050(0.0016) \\ \nu_{26}(0.1026) & 0.0005(0.0011) & -0.005(0.0012) & 0.0009(0.0011) & -0.0007(0.0039) & 0.0050(0.0016) \\ \nu_{26}(0.1026) & 0.0005(0.0011) & -0.005(0.0011) & -0.008(0.0011) & -0.0030(0.0002) & 0.0032(0.0002) \\ \nu_{44}(0.131) & 0.0070(0.0023) & -0.057(0.0015) & -0.0038(0.0011) & -0.0011(0.012) & 0.0116(0.0003) & 0.0024(0.0001) \\ \nu_{46}(0.1210) & 0.0072(0.0013) & -0.0032(0.0002) & -0.0037(0.0001) & -0.0116(0.0011) \\ \nu_{46}(0.1210) & 0.0072(0.0013) & -0.0032(0.0001) & -0.0010(0.0001) & -0.0014(0.0011) \\ \nu_{46}(0.124) & 0.0072(0.0013) & -0.0032(0.0001) & -0.0038(0.0025) & 0.0126(0.0053) & -0.0038(0.0026) \\ \nu_{46}(0.134) & -0.0052(0.0001) & -0.0032(0.0001) & -0.0038(0.0025) & 0.0126(0.0053) & -0.0038(0.0026) \\ \nu_{46}(0.134) & -0.0057(0.0013) & -0.0122(0.001) & -0.0138(0.0022) & -0.0248(0.0160) \\ \nu_{47}(0.134) & -0.0057(0.0013) & -0.0122(0.001) & -0.0138(0.0022) & -0.0248(0.0160) \\ \nu_{47}(0.134) & -0.0057(0.0013) & -0.0122(0.001) & -0.0138(0.0022) & -0.0248(0.0160) \\ \nu_{47}(0.134) & -0.0057(0.0013) & -0.017(0.0011) & -0.0138(0.0022) & -0.0248(0.0160) \\ \nu_{47}(0.1446) & -0.0357(0.075) & 0.017(0.0011) & -0.0038(0.0022) & -0.0248(0.0160) \\ \nu_{47}(0.1446) & -0.0357(0.057) & 0.0526(0.051) & 0.0138(0.0022) & -0.0248(0.0160) \\ \nu_{47}(0.1480) & -0.0148(0.0037) & -0.017(0.0011) & -0.0038(0.0022) & -0.038(0.0023) & -0.0248(0.0$	$\nu_{18}(0.0526)$	-0.0339(0.2077)	-0.0089(0.0143)	-0.0059(0.0063)	0.0121(0.0265)	-0.0294(0.1562)	-0.0248(0.1111)
$ \begin{array}{c} \mathbf{r}_{22}(0.6661) & 0.0094(0.010) & 0.0027(0.0008) & -0.0332(0.012) & -0.0328(0.1231) & -0.0027(0.0008) & 0.0111(0.0141) \\ \mathbf{r}_{28}(0.0869) & 0.0054(0.0031) & 0.007(0.0010) & -0.0133(0.0247) & 0.0096(0.0007) & -0.0032(0.0011) & -0.0084(0.0074) \\ \mathbf{r}_{29}(0.0802) & -0.0026(0.0005) & 0.0155(0.0187) & 0.0032(0.0008) & -0.0117(0.0106) & 0.0032(0.0015) & -0.0134(0.0167) \\ \mathbf{r}_{29}(0.0802) & -0.0006(0.0001) & 0.0255(0.0187) & 0.0032(0.0008) & -0.0117(0.0106) & 0.0024(0.0004) & 0.0138(0.0167) \\ \mathbf{r}_{29}(0.0822) & -0.0006(0.0011) & 0.0255(0.0520) & 0.0149(0.1299) & 0.0252(0.0471) & -0.0006(0.0010) & 0.0125(0.0007) \\ \mathbf{r}_{21}(0.0892) & -0.0005(0.0011) & 0.0035(0.0008) & 0.0029(0.0005) & -0.0030(0.0006) & 0.0097(0.0053) & 0.0050(0.0016) \\ \mathbf{r}_{29}(0.1026) & 0.0081(0.0031) & -0.0050(0.0012) & 0.0009(0.0011) & 0.0094(0.0012) & 0.0118(0.0022) & 0.0023(0.0002) \\ \mathbf{r}_{41}(0.1031) & 0.0071(0.0023) & -0.0057(0.0013) & -0.0090(0.0011) & 0.0094(0.0012) & 0.0118(0.0022) & 0.0023(0.0002) \\ \mathbf{r}_{41}(0.1138) & -0.0040(0.0006) & 0.0022(0.0001) & 0.0091(0.0011) & 0.0040(0.0011) & -0.013(0.0011) \\ \mathbf{r}_{41}(0.124) & 0.0072(0.0018) & -0.0032(0.0001) & 0.0050(0.0011) & 0.0094(0.0051) & -0.0085(0.0020) \\ \mathbf{r}_{41}(0.124) & 0.0072(0.0018) & -0.0032(0.0011) & 0.0158(0.0076) & -0.0019(0.0001) & 0.0046(0.0001) \\ \mathbf{r}_{41}(0.128) & -0.0130(0.0011) & -0.0123(0.0011) & 0.0158(0.0076) & -0.0019(0.0001) & 0.0058(0.0005) \\ \mathbf{r}_{41}(0.124) & -0.0057(0.0017) & 0.0119(0.0038) & -0.0153(0.0002) & 0.0024(0.0101) \\ \mathbf{r}_{41}(0.128) & -0.0217(0.0126) & -0.0079(0.017) & 0.0119(0.0038) & -0.0012(0.0001) & 0.0126(0.0051) \\ \mathbf{r}_{41}(0.124) & -0.0057(0.0017) & 0.0119(0.0038) & -0.0158(0.0041) & 0.0038(0.0029) & 0.0042(0.0011) \\ \mathbf{r}_{41}(0.154) & -0.0217(0.0126) & -0.0028(0.0101) & 0.0118(0.0035) & -0.0448(0.0160) \\ \mathbf{r}_{41}(0.154) & -0.0217(0.0126) & -0.0278(0.0101) & 0.0118(0.0033) & 0.0458(0.0071) \\ \mathbf{r}_{41}(0.154) & -0.0217(0.0126) & -0.0298(0.0551) & -0.0138(0.0033) & 0.0458(0.0037) \\ \mathbf{r}_{41}(0.154) & -0.0218(0.037) & -0.028(0.0111) &$	$\nu_{20}(0.0601)$	0.0168(0.0391)	0.0076(0.0080)	0.0176(0.0429)	-0.0171(0.0405)	0.0156(0.0337)	0.0124(0.0213)
	$\nu_{24}(0.0661)$	0.0094(0.0101)	0.0027(0.0008)	-0.0032(0.0012)	-0.0328(0.1231)	-0.0027(0.0008)	0.0111(0.0141)
$ \begin{array}{c} \nu_{28}(0.0733) & -0.0007(0.0001) & 0.0007(0.0001) & 0.0130(0.0157) & -0.0025(0.0006) & -0.0133(0.0165) & -0.0134(0.0167) \\ \nu_{20}(0.0802) & -0.0026(0.0005) & 0.0155(0.017) & 0.0032(0.0008) & -0.0117(0.0160) & 0.0024(0.0004) & 0.0138(0.0144) \\ \nu_{32}(0.0822) & -0.0006(0.0001) & 0.0266(0.0502) & 0.0413(0.0129) & 0.0252(0.0477) & 0.0292(0.0388) & 0.0385(0.1097) \\ \nu_{34}(0.0877) & 0.0100(0.0665) & 0.0174(0.0197) & 0.0138(0.0124) & 0.0042(0.0011) & -0.006(0.0001) & 0.0122(0.0087) \\ \nu_{36}(0.1026) & 0.0081(0.0031) & -0.0050(0.0012) & 0.0090(0.0001) & -0.0051(0.0012) & 0.0161(0.0062) & 0.0023(0.0002) \\ \nu_{43}(0.1031) & 0.0070(0.0023) & -0.007(0.0015) & -0.0008(0.0001) & -0.0051(0.0012) & 0.0161(0.0063) & 0.0023(0.0002) \\ \nu_{44}(0.1138) & -0.0040(0.0006) & 0.0022(0.0001) & 0.0080(0.001) & -0.0051(0.0012) & 0.0161(0.0063) & 0.0038(0.0002) \\ \nu_{44}(0.1124) & 0.0072(0.0108) & -0.0033(0.0002) & 0.0028(0.0001) & 0.0016(0.0001) & -0.0018(0.0001) \\ \nu_{26}(0.1224) & 0.0072(0.0018) & -0.0033(0.0002) & 0.0028(0.0001) & 0.0038(0.0005) & 0.0126(0.0053) & -0.0013(0.0001) \\ \nu_{26}(0.1314) & -0.0055(0.0009) & 0.0022(0.0011) & -0.0158(0.0076) & -0.0038(0.0004) & 0.0136(0.0059) & 0.0043(0.0006) \\ \nu_{27}(0.1446) & -0.057(0.0742) & 0.0033(0.0002) & -0.0144(0.0060) & -0.0038(0.0004) & 0.0136(0.0054) & -0.0016(0.0060) \\ \nu_{27}(0.1446) & -0.057(0.0742) & 0.0663(0.0039) & 0.0722(0.121) & 0.0176(0.0032) & -0.0248(0.0160) \\ \nu_{27}(0.1446) & -0.057(0.0742) & 0.0663(0.0039) & 0.0732(0.123) & -0.0148(0.0389) & 0.0318(0.0238) & 0.0673(0.0071) \\ \nu_{26}(0.1584) & 0.0214(0.0091) & 0.0137(0.0551) & 0.0146(0.0396) & -0.0318(0.0024) & -0.038(0.0024) & -0.038(0.0024) & -0.0248(0.0160) \\ \nu_{27}(0.1446) & -0.057(0.0375) & 0.0526(0.0551) & 0.0446(0.0396) & 0.0318(0.0238) & 0.0673(0.0071) \\ \nu_{27}(0.1584) & 0.0214(0.0091) & 0.0537(0.057) & 0.0526(0.0551) & 0.0438(0.0238) & 0.0673(0.0071) \\ \nu_{27}(0.1584) & 0.0214(0.0091) & 0.0537(0.057) & 0.0526(0.0551) & 0.0438(0.0234) & -0.055(0.0001) \\ \nu_{27}(0.1459) & 0.0212(0.0011) & 0.037(0.0033) & -0.0388(0.02$	$\nu_{26}(0.0689)$	0.0054(0.0031)	0.0074(0.0058)	-0.0153(0.0247)	0.0096(0.0097)	0.0032(0.0011)	-0.0084(0.0074)
$ \begin{array}{c} & $	$\nu_{28}(0.0733)$	-0.0007(0.0001)	0.0007(0.0001)	0.0130(0.0157)	-0.0025(0.0006)	-0.0133(0.0165)	-0.0134(0.0167)
$ \begin{array}{c} \nu_{24}(0.882) & -0.0006(0.0001) & 0.025(0.0520) & 0.0419(0.1299) & 0.0252(0.0470) & 0.0229(0.0388) & 0.0385(0.1097) \\ \nu_{24}(0.0877) & 0.0100(0.0005) & 0.0174(0.0197) & 0.0138(0.0124) & 0.0042(0.0011) & -0.0006(0.0001) & 0.0122(0.0097) \\ \nu_{25}(0.0892) & -0.0050(0.0011) & -0.0057(0.0005) & -0.0039(0.0006) & 0.0097(0.0059) & 0.0033(0.0002) \\ \nu_{30}(0.1031) & 0.0071(0.0023) & -0.0057(0.0015) & -0.0008(0.0001) & -0.0054(0.0012) & 0.0018(0.0002) \\ \nu_{41}(0.1138) & -0.0040(0.0006) & 0.0092(0.0001) & -0.0051(0.0012) & 0.0116(0.0063) & 0.0023(0.0002) \\ \nu_{41}(0.1138) & -0.0040(0.0006) & 0.0092(0.0001) & -0.0019(0.0001) & -0.0014(0.0001) & -0.0031(0.0001) \\ \nu_{41}(0.1128) & -0.0040(0.0006) & 0.0002(0.0001) & -0.0013(0.0001) & -0.0014(0.0001) & -0.0031(0.0001) \\ \nu_{41}(0.1224) & 0.0027(0.0002) & 0.0023(0.0002) & -0.0010(0.0001) & -0.0055(0.0005) & -0.0088(0.0026) \\ \nu_{41}(0.1224) & 0.0027(0.0002) & 0.0023(0.0002) & -0.0110(0.0001) & -0.0055(0.0005) & 0.0041(0.0001) \\ \nu_{42}(0.1224) & 0.0027(0.0002) & 0.0023(0.0001) & 0.0038(0.0004) & 0.0136(0.0054) & -0.0017(0.0017) \\ \nu_{55}(0.1349) & -0.0130(0.0051) & -0.0233(0.0001) & -0.018(0.0069) & -0.0224(0.0120) & -0.0245(0.0120) \\ \nu_{56}(0.1349) & -0.027(0.0012) & -0.0079(0.0017) & -0.0138(0.0004) & 0.0136(0.0054) & -0.0077(0.0017) \\ \nu_{56}(0.1349) & -0.027(0.0013) & 0.0157(0.0056) & -0.017(0.0011) & 0.0130(0.0069) & -0.0224(0.0120) & -0.0245(0.0120) \\ \nu_{59}(0.1446) & 0.0074(0.013) & 0.157(0.0556) & -0.017(0.0011) & 0.0170(0.069) & -0.0224(0.0120) & -0.0245(0.0120) \\ \nu_{59}(0.1450) & 0.0074(0.013) & 0.157(0.0556) & -0.0170(0.0011) & 0.0170(0.069) & -0.0224(0.0101) \\ \nu_{56}(0.1544) & 0.0055(0.0004) & 0.0372(0.0250) & -0.0089(0.0014) & 0.038(0.0023) & 0.0145(0.0037) \\ \nu_{59}(0.1450) & 0.037(0.0275) & -0.0222(0.0116) & -0.038(0.0023) & 0.0144(0.0339) & 0.0673(0.0011) \\ \nu_{59}(0.1544) & -0.0158(0.0035) & -0.0222(0.0116) & -0.038(0.0025) & -0.038(0.0017) & -0.0533(0.007) \\ \nu_{76}(0.1840) & -0.018(0.0031) & 0.0077(0.0011) & 0.0379(0.025) & -0.038(0.0005) & -0.033(0.001) & -0.$	$\nu_{30}(0.0802)$	-0.0026(0.0005)	0.0155(0.0187)	0.0032(0.0008)	-0.0117(0.0106)	0.0024(0.0004)	0.0136(0.0144)
$ \begin{array}{c} \mathbf{v}_{44}(0.0877) & 0.0100(0.0065) & 0.0174(0.0197) & 0.0138(0.0124) & 0.0042(0.0011) & -0.0006(0.001) & 0.0122(0.0097) \\ \mathbf{v}_{55}(0.0892) & -0.0056(0.0011) & 0.0055(0.0008) & 0.0022(0.0005) & -0.0030(0.0006) & 0.0097(0.0059) & 0.0032(0.0007) \\ \mathbf{v}_{38}(0.1026) & 0.0081(0.0031) & -0.0050(0.0012) & 0.0008(0.0001) & -0.0051(0.0122) & 0.0118(0.0002) & 0.0023(0.0002) \\ \mathbf{v}_{43}(0.1074) & 0.0013(0.0001) & 0.219(0.2088) & 0.0137(0.0081) & 0.0285(0.0352) & 0.0191(0.0158) & -0.0106(0.0049) \\ \mathbf{v}_{44}(0.1138) & -0.0040(0.0006) & 0.0002(0.0001) & -0.0016(0.0001) & -0.0016(0.0001) & -0.0016(0.0001) \\ \mathbf{v}_{46}(0.1224) & 0.0072(0.0012) & -0.0023(0.0002) & 0.0020(0.0001) & -0.0116(1.0089) & 0.0066(0.0053) & -0.0088(0.0026) \\ \mathbf{v}_{54}(0.1314) & -0.0055(0.0009) & 0.0022(0.0011) & -0.018(0.0076) & -0.0116(1.0089) & 0.0066(0.0054) & -0.0088(0.0006) \\ \mathbf{v}_{54}(0.1314) & -0.0055(0.0009) & 0.0022(0.0011) & -0.014(0.008) & -0.0038(0.0009) & 0.0033(0.0006) \\ \mathbf{v}_{54}(0.1314) & -0.0055(0.0009) & 0.0022(0.0017) & -0.0119(0.0038) & -0.0153(0.0029) & -0.0245(0.0166) \\ \mathbf{v}_{57}(0.1446) & -0.057(0.0742) & 0.0063(0.0009) & 0.0225(0.121) & 0.0170(0.0069) & -0.0224(0.0166) \\ \mathbf{v}_{57}(0.1446) & -0.057(0.0742) & 0.0663(0.0099) & 0.0225(0.121) & 0.0170(0.0069) & -0.0224(0.0166) \\ \mathbf{v}_{57}(0.1446) & -0.057(0.0742) & 0.0663(0.0099) & 0.0225(0.0121) & 0.0170(0.0069) & -0.0224(0.0120) & -0.0166(0.0066) \\ \mathbf{v}_{59}(0.1584) & 0.0074(0.013) & 0.0157(0.0565) & 0.0526(0.0551) & 0.0446(0.0386) & 0.0414(0.382) & 0.0673(0.0914) \\ \mathbf{v}_{66}(0.1584) & 0.0214(0.0013) & -0.0176(0.0054) & -0.0379(0.0220) & -0.0084(0.0144) & 0.0383(0.0230) & 0.0145(0.037) \\ \mathbf{v}_{57}(0.1840) & -0.0116(0.0051) & -0.0224(0.0111) & -0.0384(0.0224) & -0.0051(0.0004) & -0.0334(0.007) \\ \mathbf{v}_{77}(0.1847) & -0.0458(0.0355) & -0.0262(0.0111) & -0.0384(0.0224) & -0.053(0.0017) & -0.0344(0.056) \\ \mathbf{v}_{57}(0.1847) & -0.0181(0.0033) & -0.0176(0.0053) & -0.0133(0.0161) & 0.0033(0.0011) & -0.0033(0.0012) \\ \mathbf{v}_{77}(0.1847) & -0.0181(0.0033) & -0.0176(0.0053) & -0.0133(0.01$	$\nu_{32}(0.0822)$	-0.0006(0.0001)	0.0265(0.0520)	0.0419(0.1299)	0.0252(0.0470)	0.0229(0.0388)	0.0385(0.1097)
$ \begin{array}{c} \nu_{36}(0.0892) & -0.005(0.0001) & 0.0035(0.0008) & 0.0029(0.0005) & -0.0030(0.0006) & 0.0097(0.0059) & 0.0050(0.0016) \\ \nu_{36}(0.1026) & 0.0081(0.0003) & -0.0057(0.0015) & -0.0008(0.0001) & 0.0094(0.0042) & 0.0018(0.0002) & 0.0023(0.0003) \\ \nu_{40}(0.1031) & 0.0070(0.0023) & -0.0057(0.0015) & -0.0008(0.0001) & -0.0051(0.0012) & 0.0116(0.0063) & 0.0023(0.0002) \\ \nu_{43}(0.1138) & -0.0040(0.0006) & 0.0022(0.0001) & 0.0006(0.0001) & -0.00285(0.0352) & 0.0119(0.0155) & -0.0088(0.0029) \\ \nu_{44}(0.1138) & -0.0040(0.0006) & 0.0002(0.0001) & 0.0006(0.0001) & -0.0019(0.0001) & 0.0040(0.001) & -0.0008(0.0029) \\ \nu_{46}(0.1210) & 0.0077(0.0002) & 0.0023(0.0002) & 0.0020(0.0001) & 0.0039(0.0005) & 0.0126(0.0053) & -0.0033(0.0001) \\ \nu_{46}(0.1224) & 0.0027(0.0002) & 0.0022(0.0011) & -0.0185(0.0076) & -0.0010(0.0001) & -0.0055(0.0009) & 0.0043(0.0006) \\ \nu_{54}(0.1344) & -0.0055(0.0009) & 0.0022(0.0011) & -0.0148(0.0062) & 0.0029(0.0022) & -0.0244(0.0120) \\ \nu_{55}(0.1349) & -0.0217(0.0128) & -0.0079(0.0017) & 0.0119(0.0063) & -0.0136(0.0062) & 0.00224(0.0120) & -0.0245(0.1606) \\ \nu_{56}(0.1446) & -0.0577(0.0742) & 0.0083(0.0059) & 0.0222(0.0121) & 0.0170(0.0069) & -0.0224(0.0120) & -0.0244(0.0101) \\ \nu_{57}(0.1446) & -0.0577(0.0742) & 0.0083(0.0051) & 0.0117(0.0006) & -0.038(0.0044) & 0.036(0.0230) & 0.0145(0.0037) \\ \nu_{57}(0.1446) & -0.0474(0.0011) & 0.057(0.0575) & 0.0526(0.0551) & 0.0446(0.0366) & 0.031(0.0023) & 0.0673(0.0914) \\ \nu_{63}(0.1784) & 0.0145(0.0037) & -0.0724(0.0121) & -0.038(0.0114) & 0.036(0.0230) & 0.0145(0.0037) \\ \nu_{57}(0.1584) & 0.0214(0.0017) & -0.0526(0.0151) & -0.0283(0.0154) & -0.033(0.0044) & -0.0230(0.0071) \\ \nu_{77}(0.1727) & -0.0890(0.1077) & -0.0526(0.0151) & -0.0486(0.0224) & -0.051(0.0004) & -0.0230(0.0071) \\ \nu_{77}(0.1727) & -0.0890(0.1071) & -0.0227(0.0225) & -0.0383(0.0122) & 0.0427(0.0228) & 0.0669(0.0573) \\ \nu_{78}(0.1840) & -0.0118(0.0021) & -0.022(0.0015) & -0.0333(0.0126) & -0.0233(0.0128) \\ \nu_{78}(0.1840) & -0.018(0.0211) & -0.022(0.0011) & -0.0333(0.0225) & -0.0133(0.0064) & -0.0235($	$\nu_{34}(0.0877)$	0.0100(0.0065)	0.0174(0.0197)	0.0138(0.0124)	0.0042(0.0011)	-0.0006(0.0001)	0.0122(0.0097)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{35}(0.0892)$	-0.0005(0.0001)	0.0035(0.0008)	0.0029(0.0005)	-0.0030(0.0006)	0.0097(0.0059)	0.0050(0.0016)
$ \begin{array}{c} \mu_{43}(0.1031) & 0.0070(0.0023) & -0.0057(0.0015) & -0.008(0.0001) & -0.0051(0.0012) & 0.0116(0.0083) & 0.0023(0.0002) \\ \mu_{43}(0.1074) & 0.0013(0.0001) & 0.0219(0.0208) & 0.0137(0.0081) & 0.025(0.0352) & 0.0116(0.0083) & -0.0016(0.0049) \\ \mu_{44}(0.1138) & -0.0040(0.0006) & 0.0002(0.0001) & 0.0006(0.0001) & 0.0001(0.0001) & -0.0013(0.0001) \\ \mu_{46}(0.1210) & 0.0072(0.0012) & 0.0023(0.0004) & -0.0028(0.0001) & 0.0161(0.0083) & 0.0066(0.0005) \\ \mu_{48}(0.1224) & 0.0027(0.0002) & 0.0023(0.0004) & -0.0028(0.0001) & 0.0039(0.0005) & 0.0126(0.0053) & -0.0013(0.0001) \\ \mu_{52}(0.1282) & -0.0130(0.0051) & -0.0223(0.0151) & -0.0158(0.0076) & -0.0010(0.0001) & -0.0055(0.0009) & 0.0043(0.0006) \\ \mu_{54}(0.1314) & -0.0055(0.0009) & 0.0020(0.001) & -0.0144(0.0060) & -0.0038(0.0004) & 0.0136(0.0054) & -0.0077(0.0017) \\ \mu_{55}(0.1446) & -0.0557(0.0742) & 0.0063(0.0009) & 0.0225(0.121) & 0.0170(0.0069) & -0.0224(0.0120) & -0.0166(0.0066) \\ \mu_{57}(0.1446) & -0.057(0.0742) & 0.0063(0.0556) & -0.017(0.0011) & 0.011(0.0233) & -0.0448(0.0458) & 0.0002(0.0001) \\ \mu_{64}(0.1574) & 0.1447(0.4226) & 0.0863(0.1503) & 0.0782(0.1234) & 0.094(0.1686) & 0.0381(0.023) & 0.0473(0.0914) \\ \mu_{66}(0.1584) & 0.0144(0.0031) & 0.0157(0.0556) & -0.0379(0.0250) & -0.0089(0.014) & 0.0363(0.0230) & 0.0145(0.0037) \\ \mu_{67}(0.1694) & 0.0145(0.0037) & -0.016(0.0054) & -0.0379(0.0250) & -0.0089(0.014) & 0.0363(0.0230) & 0.0145(0.0037) \\ \mu_{77}(0.1584) & -0.0148(0.0055) & -0.0262(0.0116) & -0.0244(0.011) & -0.0364(0.0156) & -0.0253(0.0107) & -0.524(0.0460) \\ \mu_{77}(0.1727) & -0.0890(0.1077) & -0.0890(0.011) & 0.0187(0.0053) & -0.0080(0.0114) & 0.0363(0.0224) & -0.0051(0.0004) & -0.0203(0.0070) \\ \mu_{77}(0.1584) & -0.0158(0.0355) & -0.0262(0.0116) & -0.0258(0.0112) & 0.0363(0.0255) & -0.0133(0.0025) \\ \mu_{77}(0.1847) & -0.0161(0.0033) & 0.0124(0.0023) & 0.0046(0.0003) & 0.0110(0.0018) & 0.0056(0.0005) & -0.0133(0.0021) \\ \mu_{79}(0.1847) & -0.0161(0.0033) & 0.0124(0.0023) & 0.0028(0.0011) & -0.0334(0.0160) & -0.0534(0.0011) \\ \mu_{99}(0.3880) & -0.02143(0.035)$	$\nu_{38}(0.1026)$	0.0081(0.0031)	-0.0050(0.0012)	0.0009(0.0001)	0.0094(0.0042)	0.0018(0.0002)	0.0023(0.0003)
$ \begin{array}{c} \mu_{43}(0.1074) & 0.0013(0.001) & 0.0219(0.0208) & 0.0137(0.0081) & 0.0285(0.0352) & 0.0191(0.0158) & -0.0106(0.0049) \\ \mu_{44}(0.1138) & -0.0040(0.0066) & 0.0002(0.0001) & 0.0006(0.0001) & -0.0019(0.0001) & 0.0006(0.0011) & -0.0013(0.0001) \\ \mu_{46}(0.1210) & 0.0072(0.0018) & -0.0033(0.0004) & -0.0008(0.0001) & 0.0039(0.0005) & 0.0126(0.0053) & -0.0013(0.0001) \\ \nu_{52}(0.1282) & -0.0130(0.0051) & -0.0223(0.0151) & -0.0158(0.0076) & -0.0010(0.0001) & -0.0055(0.0009) & 0.0044(0.0006) \\ \nu_{54}(0.1314) & -0.0055(0.0009) & 0.0002(0.0001) & -0.0144(0.0060) & -0.0038(0.0004) & 0.0136(0.0054) & -0.0077(0.0017) \\ \nu_{55}(0.1369) & -0.0217(0.0126) & -0.0079(0.017) & 0.0119(0.0038) & -0.0153(0.0062) & 0.00224(0.0120) & -0.0245(0.166) \\ \nu_{57}(0.1446) & -0.0557(0.0742) & 0.0063(0.0009) & 0.0225(0.0121) & 0.0170(0.0069) & -0.0224(0.0120) & -0.0166(0.0066) \\ \nu_{57}(0.1480) & 0.0074(0.0013) & 0.157(0.0575) & 0.0526(0.0551) & 0.0446(0.0396) & 0.0414(0.0348) & 0.0002(0.0011) \\ \nu_{64}(0.1574) & 0.1447(0.4226) & 0.863(0.1503) & 0.0782(0.1234) & 0.0914(0.1686) & 0.0381(0.023) & 0.0673(0.0914) \\ \nu_{65}(0.1584) & 0.0214(0.0091) & 0.0537(0.0575) & 0.0526(0.0551) & 0.0446(0.0396) & 0.0414(0.0342) & 0.004(0.0001) \\ \nu_{67}(0.1694) & 0.0145(0.0377) & -0.0262(0.0116) & -0.0244(0.0110) & -0.0364(0.0224) & -0.0051(0.0004) & -0.023(0.0070) \\ \nu_{73}(0.1790) & 0.0367(0.2210) & 0.0300(0.0140) & 0.0178(0.0053) & -0.0383(0.0229) & 0.0427(0.0285) & 0.0609(0.057) \\ \nu_{76}(0.1829) & 0.0012(0.0011) & 0.0051(0.0004) & 0.0197(0.0061) & 0.0383(0.0229) & 0.0427(0.0285) & 0.0609(0.057) \\ \nu_{76}(0.1840) & -0.018(0.0038) & 0.0124(0.0023) & 0.0146(0.0033) & 0.0130(0.0016) & 0.0033(0.0002) \\ \nu_{76}(0.1840) & -0.018(0.0038) & 0.0124(0.0023) & 0.0046(0.0003) & 0.0110(0.0011) & -0.0033(0.0002) \\ \nu_{76}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0025(0.0011) & -0.0133(0.0064) & 0.0025(0.0011) \\ \nu_{96}(0.3765) & 0.0021(0.0011) & 0.0027(0.0011) & 0.0028(0.0011) & 0.0033(0.0001) & 0.0033(0.0001) \\ \nu_{96}(0.3765) & 0.0021(0.0011) & 0.0027(0.0011) & 0.0023(0.$	$\nu_{40}(0.1031)$	0.0070(0.0023)	-0.0057(0.0015)	-0.0008(0.0001)	-0.0051(0.0012)	0.0116(0.0063)	0.0023(0.0002)
$ \begin{array}{c} \mu_{44}(0.1138) & -0.004(0.0006) & 0.0002(0.0001) & 0.0000(0.0001) & -0.0019(0.0001) & 0.0004(0.0001) & -0.0013(0.0001) \\ \mu_{46}(0.1210) & 0.0072(0.0012) & 0.0023(0.0002) & 0.0020(0.0001) & 0.0161(0.0089) & 0.0066(0.0015) & -0.0088(0.0026) \\ \mu_{48}(0.1224) & 0.0027(0.0002) & 0.0023(0.0002) & 0.0020(0.0011) & 0.0038(0.0005) & 0.0126(0.0053) & -0.0013(0.0001) \\ \nu_{52}(0.1282) & -0.0130(0.0051) & -0.0223(0.0151) & -0.0158(0.0076) & -0.0018(0.0004) & -0.0055(0.0009) & 0.0043(0.0006) \\ \nu_{52}(0.1349) & -0.0055(0.0009) & 0.0002(0.0001) & -0.0144(0.0066) & -0.0038(0.0004) & 0.0136(0.0054) & -0.0077(0.0017) \\ \nu_{55}(0.1369) & -0.0217(0.0126) & -0.0079(0.0017) & 0.0119(0.0038) & -0.0153(0.0062) & 0.0024(0.0126) \\ \nu_{57}(0.1446) & -0.0557(0.0742) & 0.0063(0.0099) & 0.0225(0.0121) & 0.0170(0.0099) & -0.0224(0.0120) & -0.0166(0.0066) \\ \nu_{59}(0.1480) & 0.0074(0.0013) & 0.0157(0.0556) & -0.017(0.0011) & 0.0101(0.0023) & -0.0448(0.0458) & 0.0002(0.0001) \\ \nu_{65}(0.1574) & 0.1447(0.4226) & 0.0663(0.1503) & 0.0782(0.1224) & 0.0914(0.1686) & 0.0381(0.0293) & 0.0673(0.0914) \\ \nu_{65}(0.1584) & 0.0214(0.0091) & 0.0537(0.0575) & 0.0526(0.0551) & 0.0446(0.0396) & 0.0414(0.0342) & 0.0004(0.0001) \\ \nu_{67}(0.1694) & 0.0145(0.0377) & -0.078(0.0054) & -0.0379(0.0250) & -0.0089(0.014) & 0.0363(0.0230) & 0.0145(0.037) \\ \nu_{68}(0.1718) & -0.0458(0.0355) & -0.0262(0.0116) & -0.0244(0.0101) & -0.0365(0.0156) & -0.0523(0.0107) & -0.0524(0.0460) \\ \nu_{73}(0.1829) & 0.0012(0.001) & 0.0051(0.0004) & 0.0178(0.0055) & -0.0383(0.0229) & 0.0427(0.0285) & 0.6609(0.579) \\ \nu_{76}(0.1829) & 0.0012(0.001) & 0.0051(0.0004) & 0.0179(0.0051) & -0.033(0.0016) & 0.0011(0.0001) & -0.033(0.0002) \\ \nu_{73}(0.1840) & -0.0118(0.0021) & -0.0124(0.0023) & 0.0110(0.0015) & 0.033(0.0001) & 0.0033(0.0002) \\ \nu_{78}(0.1847) & -0.0161(0.0033) & 0.0124(0.0023) & 0.0121(0.0055) & -0.0333(0.0129) & 0.733(0.664) & 0.0245(0.074) \\ \nu_{86}(0.2065) & -0.2143(0.5385) & -0.0404(0.0191) & -0.0550(0.0355) & -0.0333(0.0129) & 0.0733(0.0664) & 0.035(0.001) \\ \nu_{99}(0.3765) & 0.0021$	$\nu_{43}(0.1074)$	0.0013(0.0001)	0.0219(0.0208)	0.0137(0.0081)	0.0285(0.0352)	0.0191(0.0158)	-0.0106(0.0049)
$ \begin{array}{c} \nu_{46}(0.1210) & 0.0072(0.0018) & -0.0033(0.0004) & -0.008(0.0001) & 0.0161(0.0089) & 0.0066(0.0015) & -0.0088(0.0026) \\ \nu_{48}(0.1224) & 0.0027(0.0002) & 0.0023(0.0002) & 0.0020(0.0001) & 0.0039(0.0005) & 0.0126(0.0053) & -0.0013(0.0001) \\ \nu_{52}(0.1282) & -0.0130(0.0051) & -0.0223(0.0151) & -0.0158(0.0076) & -0.0010(0.0001) & -0.0055(0.0009) & 0.0043(0.0006) \\ \nu_{54}(0.1314) & -0.0055(0.0009) & 0.0002(0.0001) & -0.0144(0.0060) & -0.0038(0.0004) & 0.0136(0.0054) & -0.0077(0.0017) \\ \nu_{55}(0.1446) & -0.0577(0.0742) & 0.0063(0.0009) & 0.0225(0.0121) & 0.0170(0.0069) & -0.0224(0.0120) & -0.0166(0.0066) \\ \nu_{59}(0.1480) & 0.0074(0.0013) & 0.0157(0.0056) & -0.0017(0.0011) & 0.0101(0.0023) & -0.448(0.0458) & 0.0002(0.0001) \\ \nu_{64}(0.1574) & 0.1447(0.4226) & 0.0863(0.1503) & 0.0782(0.1224) & 0.0014(0.1866) & 0.0381(0.0233) & 0.0673(0.0914) \\ \nu_{65}(0.1584) & 0.0214(0.0091) & 0.0537(0.0575) & 0.0526(0.0551) & 0.0486(0.0366) & 0.0414(0.0342) & 0.0004(0.0001) \\ \nu_{66}(0.1718) & -0.0458(0.0355) & -0.0262(0.0116) & -0.0244(0.011) & -0.0363(0.0223) & 0.0145(0.037) \\ \nu_{76}(0.1694) & 0.0145(0.0357) & -0.0262(0.0116) & -0.0244(0.011) & -0.0363(0.0224) & -0.0051(0.0004) & -0.0203(0.007) \\ \nu_{76}(0.1727) & -0.0809(0.1097) & -0.0080(0.011) & 0.0178(0.0053) & -0.0305(0.0156) & -0.0253(0.0107) & -0.0524(0.0460) \\ \nu_{75}(0.1840) & -0.0118(0.0021) & -0.0127(0.0024) & -0.0209(0.0055) & -0.033(0.0101) & 0.0036(0.0021) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.046(0.0033) & 0.0110(0.0018) & 0.0036(0.0013) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0148(0.0035) & -0.0133(0.0025) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0146(0.0033) & 0.0110(0.0011) & -0.0033(0.0021) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0146(0.0033) & 0.0110(0.0011) & -0.033(0.0021) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0106(0.0001) & -0.0233(0.0010) & -0.033(0.0001) \\ \nu_{99}(0.3854) & -0.0057(0.0001) & -0.0028(0.0011) & -0.0028(0.0001) & -0.0033(0.0001) & -0.0033(0.0001) \\ \nu_{99}(0.$	$\nu_{44}(0.1138)$	-0.0040(0.0006)	0.0002(0.0001)	0.0006(0.0001)	-0.0019(0.0001)	0.0004(0.0001)	-0.0013(0.0001)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{46}(0.1210)$	0.0072(0.0018)	-0.0033(0.0004)	-0.0008(0.0001)	0.0161(0.0089)	0.0066(0.0015)	-0.0088(0.0026)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{48}(0.1224)$	0.0027(0.0002)	0.0023(0.0002)	0.0020(0.0001)	0.0039(0.0005)	0.0126(0.0053)	-0.0013(0.0001)
$ \begin{array}{c} \nu_{54}(0.1314) & -0.0055(0.009) & 0.0002(0.0001) & -0.0144(0.0060) & -0.0038(0.0004) & 0.0136(0.0054) & -0.0077(0.0017) \\ \nu_{55}(0.1369) & -0.0217(0.0126) & -0.0079(0.0017) & 0.0119(0.0038) & -0.0153(0.0062) & 0.0029(0.0002) & -0.0245(0.0160) \\ \nu_{57}(0.1446) & -0.0557(0.0742) & 0.0063(0.0009) & 0.0225(0.0121) & 0.0170(0.0069) & -0.0224(0.0120) & -0.0166(0.0066) \\ \nu_{59}(0.1480) & 0.0074(0.0013) & 0.0157(0.0056) & -0.0017(0.0001) & 0.0101(0.0023) & -0.0448(0.0458) & 0.0002(0.0001) \\ \nu_{64}(0.1574) & 0.1447(0.4226) & 0.0863(0.1503) & 0.0782(0.1234) & 0.0914(0.1686) & 0.0381(0.0293) & 0.0673(0.0914) \\ \nu_{05}(0.1584) & 0.0214(0.0091) & 0.0537(0.0575) & 0.0526(0.0551) & 0.0446(0.0396) & 0.0414(0.0342) & 0.0004(0.0001) \\ \nu_{67}(0.1694) & 0.0145(0.037) & -0.0176(0.0054) & -0.0379(0.0250) & -0.0089(0.0104) & 0.0333(0.0230) & 0.0145(0.0037) \\ \nu_{70}(0.1727) & -0.0809(0.1097) & -0.080(0.0111) & 0.0178(0.0053) & -0.0385(0.0156) & -0.0253(0.0107) & -0.0524(0.0460) \\ \nu_{73}(0.1790) & 0.0367(0.0210) & 0.0300(0.0110) & 0.0197(0.0061) & 0.0383(0.0229) & 0.0427(0.0285) & 0.0609(0.0579) \\ \nu_{76}(0.1829) & 0.0012(0.0001) & 0.0051(0.0004) & 0.0119(0.0021) & 0.0056(0.0005) & 0.0030(0.0001) & 0.0093(0.0013) \\ \nu_{79}(0.1847) & -0.0181(0.0023) & 0.0124(0.0023) & 0.0146(0.0003) & 0.0110(0.0016) & 0.0033(0.0002) \\ \nu_{79}(0.1847) & -0.0181(0.0038) & 0.0124(0.0023) & 0.046(0.0003) & 0.0110(0.0016) & 0.0033(0.0021) \\ \nu_{91}(0.3847) & 0.0021(0.0001) & 0.0027(0.001) & -0.0758(0.0666) & -0.0123(0.011) & -0.0458(0.0246) \\ \nu_{88}(0.2177) & -0.181(0.0033) & -0.1323(0.1847) & -0.198(0.0355) & -0.2000(0.0477) & -0.1263(0.1870) & -0.0458(0.0246) \\ \nu_{91}(0.3847) & 0.0005(0.0001) & 0.0007(0.0001) & 0.0027(0.0001) & 0.0032(0.0001) & -0.0038(0.0001) \\ \nu_{91}(0.3847) & 0.0005(0.0001) & -0.0032(0.0001) & -0.0033(0.0001) & -0.0035(0.0001) \\ \nu_{91}(0.3843) & -0.0005(0.0001) & -0.0022(0.0001) & -0.0074(0.0002) & -0.0168(0.0003) \\ \nu_{91}(0.3843) & -0.0005(0.0001) & -0.0022(0.0001) & -0.0074(0.0002) & -0.0168(0.0001) \\ \nu_{91}(0.3983) & -0.0025(0.000$	$\nu_{52}(0.1282)$	-0.0130(0.0051)	-0.0223(0.0151)	-0.0158(0.0076)	-0.0010(0.0001)	-0.0055(0.0009)	0.0043(0.0006)
$ \begin{array}{c} \nu_{55}(0.1369) & -0.0217(0.0126) & -0.0079(0.0017) & 0.0119(0.0038) & -0.0153(0.0062) & 0.0029(0.0002) & -0.0245(0.0160) \\ \nu_{57}(0.1446) & -0.0557(0.0742) & 0.0063(0.0009) & 0.0225(0.0121) & 0.0170(0.0069) & -0.0224(0.0120) & -0.0166(0.0066) \\ \nu_{59}(0.1480) & 0.0074(0.0013) & 0.0157(0.0056) & -0.0017(0.0001) & 0.0101(0.0023) & -0.0448(0.0458) & 0.0002(0.0001) \\ \nu_{64}(0.1574) & 0.1447(0.4226) & 0.0863(0.1503) & 0.0782(0.1234) & 0.0914(0.1886) & 0.0381(0.0293) & 0.0673(0.0914) \\ \nu_{65}(0.1584) & 0.0214(0.0037) & -0.0176(0.0054) & -0.0379(0.0250) & -0.0489(0.0014) & 0.0363(0.0230) & 0.0145(0.0037) \\ \nu_{67}(0.1694) & 0.0145(0.0377) & -0.0176(0.0054) & -0.0379(0.0250) & -0.0089(0.0014) & 0.0363(0.0230) & 0.0145(0.0037) \\ \nu_{68}(0.1718) & -0.0458(0.0355) & -0.0262(0.0116) & -0.0244(0.0101) & -0.0364(0.0224) & -0.0051(0.0004) & -0.0293(0.017) \\ \nu_{70}(0.1727) & -0.0809(0.1097) & -0.0800(0.0111) & 0.0178(0.0053) & -0.0350(0.0156) & -0.0253(0.0107) & -0.0524(0.0460) \\ \nu_{73}(0.1790) & 0.0367(0.0210) & 0.0300(0.0140) & 0.0197(0.0061) & 0.0383(0.0229) & 0.427(0.0285) & 0.6609(0.0579) \\ \nu_{76}(0.1829) & 0.0012(0.0001) & 0.0051(0.0004) & 0.0119(0.0021) & 0.0056(0.0005) & -0.0033(0.0001) & 0.0033(0.0002) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.046(0.0003) & 0.0110(0.0018) & 0.0056(0.0005) & -0.0131(0.0025) \\ \nu_{84}(0.2012) & 0.451(0.0251) & 0.0292(0.0155) & 0.0221(0.0055) & 0.0323(0.0129) & 0.0733(0.664) & 0.0245(0.074) \\ \nu_{86}(0.2065) & -0.2143(0.5385) & -0.0404(0.0191) & -0.0550(0.355) & -0.2000(0.0047) & -0.1263(0.1870) & -0.0458(0.0246) \\ \nu_{88}(0.2177) & -0.0181(0.0033) & -0.1323(0.1847) & -0.194(0.4197) & -0.0758(0.0666) & -0.0102(0.0011) & -0.0038(0.0001) \\ \nu_{91}(0.3847) & 0.0005(0.0001) & 0.0007(0.0001) & 0.0027(0.0001) & 0.0023(0.0001) & -0.0033(0.0001) \\ \nu_{91}(0.3847) & 0.0005(0.0001) & -0.0032(0.0001) & -0.0032(0.0001) & -0.0035(0.0001) \\ \nu_{91}(0.3893) & -0.0025(0.0001) & -0.0022(0.0001) & -0.0074(0.0002) & -0.0168(0.0009) & 0.0005(0.0001) \\ \nu_{91}(0.3929) & -0.0822(0.0001) & -0.0022$	$\nu_{54}(0.1314)$	-0.0055(0.0009)	0.0002(0.0001)	-0.0144(0.0060)	-0.0038(0.0004)	0.0136(0.0054)	-0.0077(0.0017)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{55}(0.1369)$	-0.0217(0.0126)	-0.0079(0.0017)	0.0119(0.0038)	-0.0153(0.0062)	0.0029(0.0002)	-0.0245(0.0160)
$ \begin{array}{c} \nu_{59}(0.1480) & 0.0074(0.0013) & 0.0157(0.0056) & -0.0017(0.0001) & 0.0101(0.0023) & -0.0448(0.0458) & 0.0002(0.0001) \\ \nu_{64}(0.1574) & 0.1447(0.4226) & 0.0863(0.1503) & 0.0782(0.1234) & 0.0914(0.1686) & 0.0381(0.0293) & 0.0673(0.0914) \\ \nu_{65}(0.1584) & 0.0214(0.0091) & 0.0537(0.0575) & 0.0526(0.0551) & 0.0446(0.0396) & 0.0414(0.0342) & 0.0004(0.0001) \\ \nu_{67}(0.1694) & 0.0145(0.0037) & -0.0176(0.0054) & -0.0379(0.0250) & -0.0089(0.0014) & 0.0363(0.0230) & 0.0145(0.0037) \\ \nu_{66}(0.1718) & -0.0458(0.0355) & -0.0262(0.0116) & -0.0244(0.0101) & -0.0364(0.0224) & -0.0051(0.0004) & -0.0230(0.0070) \\ \nu_{70}(0.1727) & -0.0809(0.1097) & -0.0080(0.0111) & 0.0178(0.0053) & -0.0305(0.0156) & -0.0253(0.0107) & -0.0524(0.0460) \\ \nu_{73}(0.1790) & 0367(0.0210) & 0.0300(0.0140) & 0.0197(0.0061) & 0.0383(0.0229) & 0.0427(0.0285) & 0.0609(0.0579) \\ \nu_{76}(0.1829) & 0.0012(0.0001) & 0.0051(0.0004) & -0.019(0.0021) & 0.0056(0.0005) & -0.0030(0.0001) & 0.0093(0.0013) \\ \nu_{78}(0.1840) & -0.0118(0.0021) & -0.0127(0.0024) & -0.0209(0.0655) & -0.0103(0.016) & 0.0011(0.0001) & -0.033(0.0002) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0046(0.0003) & 0.0110(0.018) & 0.0056(0.0005) & -0.0131(0.0025) \\ \nu_{88}(0.2012) & 0.0457(0.0547) & 0.0203(0.0056) & 0.0288(0.0112) & 0.0022(0.0001) & -0.0344(0.0160) & -0.0555(0.0415) \\ \nu_{88}(0.2177) & -0.0181(0.0035) & -0.1323(0.1847) & -0.1994(0.4197) & -0.0758(0.6666) & -0.0102(0.0011) & -0.0488(0.0246) \\ \nu_{88}(0.2177) & -0.0181(0.0035) & -0.1323(0.1847) & -0.097(0.0001) & 0.0023(0.0001) & 0.0033(0.0001) \\ \nu_{99}(0.3765) & 0.0021(0.0001) & 0.0007(0.0001) & -0.0017(0.0001) & 0.0002(0.0001) & -0.0033(0.0001) \\ \nu_{99}(0.3847) & 0.0005(0.0001) & -0.0002(0.0001) & -0.0019(0.0001) & -0.0033(0.0001) \\ \nu_{99}(0.3849) & -0.0025(0.0001) & -0.0022(0.0001) & -0.0075(0.0001) & -0.0035(0.0001) \\ \nu_{99}(0.3929) & -0.0082(0.0002) & -0.0052(0.0001) & -0.0022(0.0001) & -0.0033(0.0001) & -0.0005(0.0001) \\ \nu_{99}(0.3924) & 0.0061(0.0001) & 0.0002(0.0001) & -0.0022(0.0001) & -0.0033(0.0001) & -0$	$\nu_{57}(0.1446)$	-0.0557(0.0742)	0.0063(0.0009)	0.0225(0.0121)	0.0170(0.0069)	-0.0224(0.0120)	-0.0166(0.0066)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{59}(0.1480)$	0.0074(0.0013)	0.0157(0.0056)	-0.0017(0.0001)	0.0101(0.0023)	-0.0448(0.0458)	0.0002(0.0001)
$ \begin{array}{c} \nu_{65}(0.1584) & 0.0214(0.001) & 0.0537(0.0575) & 0.0526(0.0551) & 0.0446(0.0396) & 0.0414(0.0342) & 0.0004(0.0001) \\ \nu_{67}(0.1694) & 0.0145(0.0037) & -0.0176(0.0054) & -0.0379(0.0250) & -0.0089(0.0014) & 0.0363(0.0230) & 0.0145(0.0037) \\ \nu_{68}(0.1718) & -0.0458(0.0355) & -0.0262(0.0116) & -0.0244(0.0101) & -0.0364(0.0224) & -0.0051(0.0004) & -0.0203(0.0070) \\ \nu_{70}(0.1727) & -0.0809(0.1097) & -0.0080(0.0011) & 0.0178(0.0053) & -0.0305(0.0156) & -0.0253(0.0107) & -0.0524(0.0460) \\ \nu_{73}(0.1790) & 0.0367(0.0210) & 0.0300(0.0140) & 0.0197(0.0061) & 0.0383(0.0229) & 0.0427(0.0285) & 0.0609(0.0579) \\ \nu_{76}(0.1829) & 0.0012(0.0001) & 0.0051(0.0004) & 0.0119(0.0021) & 0.0056(0.0005) & 0.0030(0.0011) & 0.0093(0.0013) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0046(0.0003) & 0.0110(0.0018) & 0.0056(0.0005) & -0.0131(0.0025) \\ \nu_{82}(0.1926) & 0.0637(0.0547) & 0.0203(0.0566) & 0.0288(0.0112) & 0.0022(0.0001) & -0.0344(0.0160) & -0.0555(0.0415) \\ \nu_{84}(0.2012) & 0.0451(0.0251) & 0.0292(0.0105) & 0.0211(0.0055) & 0.0323(0.0129) & 0.0733(0.0664) & 0.0245(0.0074) \\ \nu_{86}(0.2065) & -0.2143(0.5385) & -0.0404(0.0191) & -0.0550(0.0355) & -0.0200(0.0047) & -0.1263(0.1870) & -0.0458(0.0246) \\ \nu_{86}(0.2177) & -0.0181(0.0035) & -0.1323(0.1847) & -0.194(0.4197) & -0.0758(0.0666) & -0.0102(0.0011) & -0.0458(0.0246) \\ \nu_{86}(0.2177) & -0.0181(0.0035) & -0.0132(0.0001) & 0.0027(0.0001) & 0.0022(0.0011) & -0.0033(0.0001) \\ \nu_{90}(0.3765) & 0.0021(0.0001) & 0.0077(0.0001) & 0.0027(0.001) & 0.0025(0.0011) & -0.0038(0.0001) \\ \nu_{91}(0.3847) & 0.0005(0.0001) & -0.009(0.0001) & -0.0010(0.0001) & -0.0033(0.0001) & -0.0005(0.0001) \\ \nu_{95}(0.3922) & 0.0046(0.0001) & 0.0035(0.0001) & -0.0010(0.0001) & -0.0033(0.0001) & -0.0057(0.0001) \\ \nu_{95}(0.3922) & 0.0046(0.0001) & 0.0035(0.0001) & -0.0022(0.0001) & -0.0035(0.0001) & -0.0057(0.0001) \\ \nu_{99}(0.3983) & -0.0005(0.0001) & -0.0025(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & -0.0035(0.0001) \\ \nu_{99}(0.3983) & -0.0022(0.0001) & -0.0028(0.0001) & -0.0022(0.0001) & -$	$\nu_{64}(0.1574)$	0.1447(0.4226)	0.0863(0.1503)	0.0782(0.1234)	0.0914(0.1686)	0.0381(0.0293)	0.0673(0.0914)
$ \begin{array}{c} \nu_{67}(0.1694) & 0.0145(0.0037) & -0.0176(0.0054) & -0.0379(0.0250) & -0.0089(0.0014) & 0.0363(0.0230) & 0.0145(0.0037) \\ \nu_{68}(0.1718) & -0.0458(0.0355) & -0.0262(0.0116) & -0.0244(0.0101) & -0.0364(0.0224) & -0.0051(0.0004) & -0.0203(0.0070) \\ \nu_{70}(0.1727) & -0.0809(0.1097) & -0.0080(0.0011) & 0.0178(0.0053) & -0.0305(0.0156) & -0.0253(0.017) & -0.0524(0.0460) \\ \nu_{73}(0.1790) & 0.0367(0.0210) & 0.0300(0.0140) & 0.0197(0.0061) & 0.0383(0.0229) & 0.0427(0.0285) & 0.0609(0.0579) \\ \nu_{76}(0.1829) & 0.0012(0.0001) & 0.0051(0.0004) & 0.0119(0.0021) & 0.0056(0.0005) & 0.0030(0.0001) & 0.0093(0.0013) \\ \nu_{78}(0.1840) & -0.0118(0.0021) & -0.0127(0.0024) & -0.0209(0.0065) & -0.0103(0.0016) & 0.0011(0.0001) & -0.0033(0.0002) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0046(0.0003) & 0.0110(0.0018) & 0.0056(0.0005) & -0.0131(0.0025) \\ \nu_{82}(0.1926) & 0.0637(0.0547) & 0.0203(0.0056) & 0.0288(0.0112) & 0.0002(0.0001) & -0.0344(0.0160) & -0.0555(0.0415) \\ \nu_{84}(0.2012) & 0.0451(0.0251) & 0.0292(0.0105) & 0.0211(0.0055) & 0.0323(0.0129) & 0.0733(0.0664) & 0.0245(0.0074) \\ \nu_{86}(0.2065) & -0.2143(0.5385) & -0.0404(0.0191) & -0.0550(0.0355) & -0.0200(0.0047) & -0.1263(0.1870) & -0.0458(0.0246) \\ \nu_{88}(0.2177) & -0.0181(0.0035) & -0.1323(0.1847) & -0.1994(0.4197) & -0.0758(0.0606) & -0.0102(0.0011) & -0.0140(0.0021) \\ \nu_{90}(0.3765) & 0.0021(0.0001) & 0.007(0.0001) & 0.0027(0.0001) & 0.0023(0.0001) & 0.0038(0.0001) \\ \nu_{91}(0.3889) & -0.005(0.0011) & -0.0099(0.0001) & -0.0010(0.0001) & 0.0032(0.0001) & -0.0005(0.0001) \\ \nu_{97}(0.3929) & -0.0082(0.0002) & -0.0052(0.0001) & -0.0022(0.0001) & -0.0035(0.0001) & -0.0057(0.0001) \\ \nu_{99}(0.3933) & -0.0021(0.0001) & 0.0010(0.0001) & 0.0022(0.0001) & -0.0038(0.0001) \\ \nu_{99}(0.3933) & -0.0021(0.0001) & -0.0028(0.0001) & -0.0074(0.0002) & -0.0168(0.0009) & 0.0095(0.0001) \\ \nu_{99}(0.3933) & -0.0021(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0018(0.0001) & -0.0018(0.0001) \\ \nu_{99}(0.3933) & -0.0021(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0018(0.0$	$\nu_{65}(0.1584)$	0.0214(0.0091)	0.0537(0.0575)	0.0526(0.0551)	0.0446(0.0396)	0.0414(0.0342)	0.0004(0.0001)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{67}(0.1694)$	0.0145(0.0037)	-0.0176(0.0054)	-0.0379(0.0250)	-0.0089(0.0014)	0.0363(0.0230)	0.0145(0.0037)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{68}(0.1718)$	-0.0458(0.0355)	-0.0262(0.0116)	-0.0244(0.0101)	-0.0364(0.0224)	-0.0051(0.0004)	-0.0203(0.0070)
$ \begin{array}{c} \nu_{73}(0.179) & 0.0367(0.0210) & 0.0300(0.014) & 0.0197(0.0061) & 0.0383(0.0229) & 0.0427(0.0285) & 0.0609(0.0579) \\ \nu_{76}(0.1829) & 0.0012(0.0001) & 0.0051(0.0004) & 0.0119(0.0021) & 0.0056(0.0005) & 0.0030(0.0001) & 0.0093(0.0013) \\ \nu_{78}(0.1840) & -0.0118(0.0021) & -0.0127(0.0024) & -0.0209(0.0665) & -0.0103(0.0016) & 0.0011(0.0001) & -0.0033(0.0002) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0046(0.0003) & 0.0110(0.0018) & 0.0056(0.0005) & -0.0131(0.0025) \\ \nu_{82}(0.1926) & 0.0637(0.0547) & 0.0203(0.0056) & 0.0288(0.0112) & 0.0002(0.0001) & -0.0344(0.0160) & -0.0555(0.0415) \\ \nu_{84}(0.2012) & 0.0451(0.0251) & 0.0292(0.0105) & 0.0211(0.0055) & 0.0323(0.0129) & 0.0733(0.0664) & 0.0245(0.0074) \\ \nu_{86}(0.2065) & -0.2143(0.5385) & -0.0404(0.0191) & -0.0550(0.0355) & -0.0200(0.0047) & -0.1263(0.1870) & -0.0458(0.0246) \\ \nu_{88}(0.2177) & -0.0181(0.0035) & -0.1323(0.1847) & -0.1994(0.4197) & -0.0758(0.0666) & -0.0102(0.0011) & -0.0140(0.0021) \\ \nu_{90}(0.3765) & 0.0021(0.0001) & 0.0007(0.0001) & 0.0027(0.0001) & 0.0023(0.0001) & 0.0038(0.0001) \\ \nu_{91}(0.3847) & 0.0005(0.0001) & -0.0009(0.0001) & -0.0010(0.0003) & 0.0025(0.0001) & -0.0035(0.0001) \\ \nu_{95}(0.3922) & 0.0046(0.0001) & 0.0035(0.0001) & 0.0016(0.0001) & 0.0025(0.0001) & -0.0035(0.0001) \\ \nu_{97}(0.3929) & -0.082(0.002) & -0.0552(0.0011) & -0.0022(0.0001) & -0.0074(0.0022) & -0.0168(0.0099) & 0.0005(0.0001) \\ \nu_{99}(0.3954) & 0.0061(0.0001) & 0.0010(0.0001) & 0.0022(0.0001) & -0.0033(0.0001) & 0.0099(0.0003) \\ \nu_{99}(0.3983) & -0.0021(0.0001) & 0.0010(0.0001) & 0.0022(0.0001) & -0.0033(0.0001) & -0.0057(0.0001) \\ \nu_{99}(0.3983) & -0.0021(0.0001) & 0.0010(0.0001) & 0.0022(0.0001) & -0.0038(0.0001) & -0.0057(0.0001) \\ \nu_{99}(0.3983) & -0.0021(0.0001) & 0.0010(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & 0.0033(0.0001) & 0.0099(0.0003) \\ \nu_{100}(0.3983) & -0.0021(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0$	$\nu_{70}(0.1727)$	-0.0809(0.1097)	-0.0080(0.0011)	0.0178(0.0053)	-0.0305(0.0156)	-0.0253(0.0107)	-0.0524(0.0460)
$\begin{array}{c} \nu_{76}(0.1829) & 0.0012(0.0001) & 0.0051(0.0004) & 0.0119(0.0021) & 0.0056(0.0005) & 0.0030(0.0001) & 0.0093(0.0001) \\ \nu_{78}(0.1840) & -0.0118(0.0021) & -0.0127(0.0024) & -0.0209(0.0065) & -0.0103(0.0016) & 0.0011(0.0001) & -0.0033(0.0002) \\ \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0046(0.0003) & 0.0110(0.0018) & 0.0056(0.0005) & -0.0131(0.0025) \\ \nu_{82}(0.1926) & 0.0637(0.0547) & 0.0203(0.0056) & 0.0288(0.0112) & 0.0002(0.0001) & -0.0344(0.0160) & -0.0555(0.0415) \\ \nu_{84}(0.2012) & 0.0451(0.0251) & 0.0292(0.0105) & 0.0211(0.0055) & 0.0323(0.0129) & 0.0733(0.0664) & 0.0245(0.0074) \\ \nu_{86}(0.2065) & -0.2143(0.5385) & -0.0404(0.0191) & -0.0550(0.0355) & -0.0200(0.0047) & -0.1263(0.1870) & -0.0458(0.0246) \\ \nu_{88}(0.2177) & -0.0181(0.0035) & -0.1323(0.1847) & -0.1994(0.4197) & -0.0758(0.0606) & -0.0102(0.0011) & -0.0140(0.0021) \\ \nu_{90}(0.3765) & 0.0021(0.0001) & 0.0007(0.0001) & 0.0027(0.0001) & 0.0019(0.0001) & 0.0023(0.0001) \\ \nu_{91}(0.3847) & 0.0005(0.0001) & -0.0099(0.0001) & -0.0010(0.0001) & 0.0022(0.0001) & -0.0003(0.0001) \\ \nu_{94}(0.3889) & -0.0005(0.0001) & 0.0035(0.0001) & 0.0016(0.0001) & 0.0025(0.0001) & -0.0035(0.0001) \\ \nu_{95}(0.3922) & 0.0046(0.0001) & 0.0035(0.0001) & 0.0016(0.0001) & -0.0033(0.0001) & -0.0005(0.0001) \\ \nu_{99}(0.3954) & 0.0061(0.0001) & 0.0010(0.0001) & -0.0074(0.0002) & -0.0168(0.0009) & 0.0005(0.0001) \\ \nu_{99}(0.3983) & -0.0021(0.0001) & 0.0010(0.0001) & -0.0022(0.0001) & -0.0033(0.0001) & -0.0005(0.0001) \\ \nu_{99}(0.3954) & 0.0061(0.0001) & 0.0010(0.0001) & -0.0022(0.0001) & -0.0033(0.0001) & -0.0057(0.0001) \\ \nu_{99}(0.3983) & -0.0021(0.0001) & 0.0010(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) \\ \nu_{99}(0.3983) & -0.0021(0.0001) & -0.0022(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) \\ \nu_{99}(0.3983) & -0.0021(0.0001) & -0.0028(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0$	$\nu_{73}(0.1790)$	0.0367(0.0210)	0.0300(0.0140)	0.0197(0.0061)	0.0383(0.0229)	0.0427(0.0285)	0.0609(0.0579)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{76}(0.1829)$	0.0012(0.0001)	0.0051(0.0004)	0.0119(0.0021)	0.0056(0.0005)	0.0030(0.0001)	0.0093(0.0013)
$ \begin{array}{c} \nu_{79}(0.1847) & -0.0161(0.0038) & 0.0124(0.0023) & 0.0046(0.0003) & 0.0110(0.0018) & 0.0056(0.0005) & -0.0131(0.0025) \\ \nu_{82}(0.1926) & 0.0637(0.0547) & 0.0203(0.0056) & 0.0288(0.0112) & 0.0002(0.0001) & -0.0344(0.0160) & -0.0555(0.0415) \\ \nu_{84}(0.2012) & 0.0451(0.0251) & 0.0292(0.0105) & 0.0211(0.0055) & 0.0323(0.0129) & 0.0733(0.0664) & 0.0245(0.0074) \\ \nu_{86}(0.2065) & -0.2143(0.5385) & -0.0404(0.0191) & -0.0550(0.0355) & -0.0200(0.0047) & -0.1263(0.1870) & -0.0458(0.0246) \\ \nu_{88}(0.2177) & -0.0181(0.0035) & -0.1323(0.1847) & -0.1994(0.4197) & -0.0758(0.0666) & -0.0102(0.0011) & -0.0140(0.0021) \\ \nu_{90}(0.3765) & 0.0021(0.0001) & 0.0007(0.0001) & 0.0027(0.0001) & 0.0019(0.0001) & 0.0023(0.0001) & 0.0038(0.0001) \\ \nu_{91}(0.3847) & 0.0005(0.0001) & -0.0009(0.0001) & -0.0010(0.0003) & 0.0025(0.0001) & -0.0011(0.0001) & -0.0009(0.0001) \\ \nu_{95}(0.3922) & 0.0046(0.0001) & 0.0035(0.0001) & 0.0016(0.0001) & 0.0025(0.0001) & -0.0035(0.0001) & -0.0057(0.0001) \\ \nu_{99}(0.3954) & 0.0061(0.0001) & 0.0010(0.0001) & -0.0074(0.0002) & -0.0168(0.0009) & 0.0005(0.0001) \\ \nu_{99}(0.3983) & -0.0021(0.0001) & -0.0020(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & 0.0099(0.0003) \\ \nu_{100}(0.3983) & -0.0021(0.0001) & 0.0008(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0186(0.0011) \\ \nu_{99}(0.3999) & -0.0025(0.0001) & -0.0008(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0186(0.0011) \\ \nu_{100}(0.3999) & -0.0025(0.0001) & -0.0008(0.0001) & -0.0028(0.$	$\nu_{78}(0.1840)$	-0.0118(0.0021)	-0.0127(0.0024)	-0.0209(0.0065)	-0.0103(0.0016)	0.0011(0.0001)	-0.0033(0.0002)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{79}(0.1847)$	-0.0161(0.0038)	0.0124(0.0023)	0.0046(0.0003)	0.0110(0.0018)	0.0056(0.0005)	-0.0131(0.0025)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{82}(0.1926)$	0.0637(0.0547)	0.0203(0.0056)	0.0288(0.0112)	0.0002(0.0001)	-0.0344(0.0160)	-0.0555(0.0415)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{84}(0.2012)$	0.0451(0.0251)	0.0292(0.0105)	0.0211(0.0055)	0.0323(0.0129)	0.0733(0.0664)	0.0245(0.0074)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{86}(0.2065)$	-0.2143(0.5385)	-0.0404(0.0191)	-0.0550(0.0355)	-0.0200(0.0047)	-0.1263(0.1870)	-0.0458(0.0246)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{88}(0.2177)$	-0.0181(0.0035)	-0.1323(0.1847)	-0.1994(0.4197)	-0.0758(0.0606)	-0.0102(0.0011)	-0.0140(0.0021)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\nu_{90}(0.3765)$	0.0021(0.0001)	0.0007(0.0001)	0.0027(0.0001)	0.0019(0.0001)	0.0023(0.0001)	0.0038(0.0001)
$ \begin{array}{c} \nu_{94}(0.3889) & -0.0005(0.0001) & 0.0079(0.0002) & 0.0100(0.0003) & 0.0025(0.0001) & -0.0003(0.0001) & -0.0005(0.0001) \\ \nu_{95}(0.3922) & 0.0046(0.0001) & 0.0035(0.0001) & 0.0016(0.0001) & 0.0061(0.0001) & -0.0035(0.0001) & -0.0057(0.0001) \\ \nu_{97}(0.3929) & -0.0082(0.0002) & -0.0052(0.0001) & -0.0022(0.0001) & -0.0074(0.0002) & -0.0168(0.0009) & 0.0005(0.0001) \\ \nu_{99}(0.3954) & 0.0061(0.0001) & 0.0010(0.0001) & -0.0004(0.0001) & 0.0046(0.0001) & 0.0033(0.0001) & 0.0099(0.0003) \\ \nu_{100}(0.3983) & -0.0021(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0186(0.0011) \\ \nu_{100}(0.3999) & -0.0025(0.0001) & 0.0008(0.0001) & 0.0016(0.0001) & -0.0017(0.0001) & -0.0138(0.0006) & 0.0051(0.0001) \\ \end{array}$	$\nu_{91}(0.3847)$	0.0005(0.0001)	-0.0009(0.0001)	-0.0010(0.0001)	0.0002(0.0001)	-0.0011(0.0001)	-0.0009(0.0001)
$ \begin{array}{c} \nu_{95}(0.3922) & 0.0046(0.0001) & 0.0035(0.0001) & 0.0016(0.0001) & 0.0061(0.0001) & -0.0035(0.0001) & -0.0057(0.0001) \\ \nu_{97}(0.3929) & -0.0082(0.0002) & -0.0052(0.0001) & -0.0022(0.0001) & -0.0074(0.0002) & -0.0168(0.0009) & 0.0005(0.0001) \\ \nu_{99}(0.3954) & 0.0061(0.0001) & 0.0010(0.0001) & -0.0004(0.0001) & 0.0046(0.0001) & 0.0033(0.0001) & 0.0099(0.0003) \\ \nu_{100}(0.3983) & -0.0021(0.0001) & -0.0020(0.0001) & -0.0028(0.0001) & -0.0022(0.0001) & -0.0028(0.0001) & -0.0186(0.0011) \\ \nu_{100}(0.3999) & -0.0025(0.0001) & 0.0008(0.0001) & 0.0016(0.0001) & -0.0017(0.0001) & -0.0138(0.0006) & 0.0051(0.0001) \\ \end{array} $	$\nu_{94}(0.3889)$	-0.0005(0.0001)	0.0079(0.0002)	0.0100(0.0003)	0.0025(0.0001)	-0.0003(0.0001)	-0.0005(0.0001)
$ \begin{array}{c} \nu_{97}(0.3929) & -0.0082(0.0002) & -0.0052(0.0001) & -0.0022(0.0001) & -0.0074(0.0002) & -0.0168(0.0009) & 0.0005(0.0001) \\ \nu_{99}(0.3954) & 0.0061(0.0001) & 0.0010(0.0001) & -0.0004(0.0001) & 0.0046(0.0001) & 0.0033(0.0001) & 0.0099(0.0003) \\ \nu_{100}(0.3983) & -0.0021(0.0001) & -0.0020(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0028(0.0001) & -0.0186(0.0011) \\ \nu_{100}(0.3999) & -0.0025(0.0001) & 0.0008(0.0001) & 0.0016(0.0001) & -0.0017(0.0001) & -0.0138(0.0006) & 0.0051(0.0001) \\ \end{array} $	$\nu_{95}(0.3922)$	0.0046(0.0001)	0.0035(0.0001)	0.0016(0.0001)	0.0061(0.0001)	-0.0035(0.0001)	-0.0057(0.0001)
$ \begin{array}{c} \nu_{99}(0.3954) \\ \nu_{100}(0.3983) \\ \nu_{100}(0.3998) \\ \nu_{100}(0.3999) \\ \nu_{100}(0.3999) \\ \end{array} \\ \begin{array}{c} 0.0025(0.0001) \\ 0.0008(0.0001) \\ 0.0008(0.0001) \\ 0.0016(0.0001) \\ 0.0016(0.0001) \\ 0.0016(0.0001) \\ 0.0016(0.0001) \\ 0.0016(0.0001) \\ 0.0017(0.0001) \\ -0.0138(0.0006) \\ 0.0051(0.0001) \\ 0$	$\nu_{97}(0.3929)$	-0.0082(0.0002)	-0.0052(0.0001)	-0.0022(0.0001)	-0.0074(0.0002)	-0.0168(0.0009)	0.0005(0.0001)
$\nu_{100}(0.3983) = -0.0021(0.0001) = -0.0020(0.0001) = -0.0028(0.0001) = -0.0022(0.0001) = -0.0028(0.$	$\nu_{99}(0.3954)$	0.0061(0.0001)	0.0010(0.0001)	-0.0004(0.0001)	0.0046(0.0001)	0.0033(0.0001)	0.0099(0.0003)
$\mu_{100}(0.3999)$ =0.0025(0.0001) 0.0008(0.0001) 0.0016(0.0001) =0.0017(0.0001) =0.0138(0.0006) 0.0051(0.0001)	$\nu_{100}(0.3983)$	-0.0021(0.0001)	-0.0020(0.0001)	-0.0028(0.0001)	0.0022(0.0001)	-0.0028(0.0001)	-0.0186(0.0011)
$p_{102}(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0110(0.0001) = 0.0110(0.0001) = 0.0000(0.0001) = 0.0000(0.0001) = 0.0000(0.0001) = 0.0000(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0010(0.0001) = 0.0000(0.0000000000000000000000000000$	$\nu_{102}(0.3999)$	-0.0025(0.0001)	0.0008(0.0001)	0.0016(0.0001)	-0.0017(0.0001)	-0.0138(0.0006)	-0.0051(0.0001)

Table S13: Linear interstate coupling parameters (λ) for triplet electronic states of **AP2** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength ($\lambda^2/2\omega^2$) obtained for each vibrational mode is shown in paramthesis.

$^{\lambda}T_1 - T_4$ $^{\lambda}T_1 - T_5$ $^{\lambda}$	$T_1 - T_6 \qquad \lambda T_2 - T_3$	$^{\lambda_{T_3-T_4}}$	$\lambda_{T_3-T_5}$	$\lambda T_3 - T_6$
- 0.0217(6.1250)		.0157 (3.2062)	0.0368 (17.6150)	0.0353 (16.2082)
0) 0.0377 (11.1038) 0.0283(6.2570) 0	.0255 (5.0801) - 0.0	.0074 (0.4278)	0.0052 (0.2113)	
2) 0.0196 (0.7893) -	0.	0.0082(0.1381)	0.0126(0.3262)	
9) 0.0201 (0.4411) -	0.1	(0.0681)		
4) 0.0508 (2.7402) -	0.1	.0158 (0.2651)	0.0159 (0.2684)	$0.0152 \ (0.2453)$
1) 0.0224 (0.3089) -	0.1	.0076(0.0356)	ı	
2) $0.0530(1.2441)$ -	0.1	.0114(0.0576)		
0.0243(0.2134) -	- 0.0136 (0.0668)		1	
- 0.0237(0.1526)	- 0.0186 (0.0940)		1	
$1) \qquad 0.0305 (0.1607) \qquad 0.0212 (0.0776)$	- 0.0124 (0.0266)			
1) 0.0220 (0.0653) -	0.6	.0058(0.0045)		
4) 0.0249 (0.0779) -	- 0.0042 (0.0022)			
4) 0.0462 (0.2647) -	- 0.0078 (0.0075)			
4) 0.0445 (0.2259) -	0.6	.0100 (0.0114)	ı	
0.0546(0.3051) $0.0295(0.0891)$	- 0.6	.0247 (0.0624)	0.0386(0.1525)	$0.0361 \ (0.1334)$
		0132 (0.0146)	0.0070 (0.0050)	0 0007 (0 0078)
0.0440 (0.1041)		(0*TO'O) COTO:		
	- 0.0103 (0.0081)		0.0062(0.0029)	0.0083 (0.0052)
8) 0.0335 (0.0730) -	0.1	(0097 (0.0061)	1	0.0105(0.0072)
	- 0.0101 (0.0062)	,	,	,
5) 0.0502 (0.1379) 0.0354(0.0686)	- 0.0065 (0.0023) 0.0	(2000-0) 2100-	,	,
	0.0118 (0.0066)			
0.0243 (0.0270) 0.0189(0.0164)	- 0.0279 (0.0356)		ı	ı
8) 0.0313 (0.0434) -	- 0.0096 (0.0041)			
0.0513 (0.0945) -	- 0.0121 (0.0053) 0.0	.0142(0.0072)		
6) 0.0422 (0.0602) -	- 0.0075 (0.0019)	, ,		,
		-		
2)	0.1	.0023(0.0002)		
- 0.0142(0.0063)	0.0217(0.0148) $0.0124(0.0048)$	ı		,
0.0159(0.0076)	- 0	0.0109(0.0036)	0.0249(0.0187)	0.0234 (0.0165)
- (acenin) onenin ()	n (ennnin) nennin -	(10000) econ.		
0.0120 (0.0033) -	1.0207 (0.0099) - 0.t	.0108(0.0027)		0.0226 (0.0118)
0.0459 (0.0476) 0.0242(0.0132)	0.1	.0164 (0.0061)	0.0230(0.0119)	0.0170(0.0065)
		0288 (0.0184)	0.0413 (0.0378)	ດ ດອດຈຸດ ດູດອດ)
		(1000 0) 0110	(0100.0) 01±0.0	(nenn) =n=n:n
- (/TATTA) GRADA	- U.U354 (U.U264) U.	(conn.n) o/.tn:		
0.0630(0.0820) -	- 0.0217 (0.0097) 0.1	.0178(0.0065)	0.0116(0.0028)	,
0.0318 (0.0184) -	³ .0416 (0.0314) - 0.0	.0186 (0.0063)	0.0285(0.0148)	0.0390 (0.0276)
0.0384 (0.0950)		0155 (0 0041)	0.0215 (0.0078)	0.0217 (0.0080)
			(0100.0) 0T=0.0	
- (TGTT:0) 0580.0 (T	J.U408 (U.U300) - U.	(e/nn/n) ZIZN.		0.0168 (0.0047)
7) 0.0536 (0.0469) 0.0524(0.0448) 1	1.0680(0.0754) 0.0099(0.0016) 0.0	(1000.0) $6100.$	'	0.0181(0.0053)
1) 0.0307 (0.0147) 0.0467 (0.0339) (0.0426 (0.0282) 0.0062 (0.0006)		0.0141 (0.0031)	0.0102 (0.0016)
0.0135(0.0027) 0.0154(0.0035)	0.6	.0053 (0.0004)	0.0099 (0.0015)	0.0093 (0.0013)
0.0122 (0.0022) 0.0151 (0.0034)	0.6	.0061 (0.0006)	0.0114 (0.0019)	0.0132 (0.0026)
0 (0077-0)07710 (6160-0) 000000 (0	(00000) 657000 (TZTOO) 06701		(ternn) onenn	
0.0817 (0.0916) -	- 0.0283 (0.0110) 0.0	.0141 (0.0027)		
2) 0.1374 (0.2353) -	1.1064 (0.1411) - 0.t	.0230(0.0066)		,
2) 0.0357 (0.0153) 0.0487(0.0285)	- 0.0441 (0.0234)			,
0.2133 (0.4822) 0.0375(0.0149)	- $0.0935(0.0327)$ 0.6	.0668 (0.0473)	0.0389 (0.0160)	0.0251 (0.0067)
(9T00'0)ZTZ0'0 -		(1000.0) 8800.	0.0095 (0.0003)	0.0080 (0.0002)
- 0.0181(0.0011)	0.	.0046(0.0001)	0.0108(0.0004)	0.0123 (0.0005)
5) 0.0213 (0.0015) -	- 0.0076 (0.0002)	,		
		(1000 0) 8000	(1000 0) 6600 0	(2000 0) 0800 0
(2000) 0.0100 0.00	1).0241 (0.0019)	(TAAAA) 6700.	(1000.0) 2200.0	(2000.0) USUU.U
3) 0.0135 (0.0006) 0.0174(0.0010)	J.0168 (0.0009) 0.0021 (0.0001) 0.0	.0015 (0.0001)	0.0040 (0.0001)	0.0048 (0.0001)
2) 0.0148 (0.0007) -	1.0 (1000 0000) 0.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.000000	0023 (0.0001)		0.0013 (0.0001)

Table S14: Linear intrastate coupling parameters (κ) for singlet electronic states of **AP4** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength ($\kappa^2/2\omega^2$) obtained for each vibrational mode is shown in parameters.

AG mode	κ^{S_1}	κ^{S_2}	κ^{S_3}	κ^{S_4}	κ^{S_5}	κ^{S_6}
(Freq, eV)						
$\nu_3(0.0065)$	-0.0171(3.4605)	-0.0286(9.6800)	-0.0357(15.0846)	-0.0419(20.7720)	-0.0420(20.8525)	-0.0332(13.0098)
$\nu_7(0.0098)$	-0.0080(0.3332)	-0.0035(0.0638)	-0.0089(0.4116)	-0.0042(0.0934)	-0.0014(0.0105)	-0.0041(0.0858)
$\nu_{10}(0.0179)$	-0.0086(0.1154)	-0.0068(0.0722)	-0.0062(0.0606)	-0.0048(0.0360)	-0.0043(0.0294)	-0.0002(0.0001)
$\nu_{15}(0.0212)$	-0.0019(0.0040)	0.0098(0.1068)	0.0110(0.1339)	0.0126(0.1768)	0.0124(0.1722)	0.0097(0.1053)
$\nu_{20}(0.0338)$	-0.0033(0.0048)	-0.0005(0.0001)	0.0133(0.0778)	0.0217(0.2068)	0.0068(0.0203)	0.0034(0.0051)
$\nu_{22}(0.0343)$	0.0131(0.0729)	-0.0011(0.0005)	0.0013(0.0007)	-0.0024(0.0024)	-0.0029(0.0035)	0.0093(0.0365)
$\nu_{29}(0.0482)$	0.0233(0.1168)	0.0115(0.0285)	0.0187(0.0756)	0.0141(0.0425)	0.0113(0.0273)	0.0038(0.0030)
$\nu_{32}(0.0620)$	0.0228(0.0676)	0.0118(0.0181)	0.0146(0.0278)	0.0173(0.0390)	0.0079(0.0081)	-0.0274(0.0975)
$\nu_{37}(0.0687)$	-0.0116(0.0143)	-0.0001(0.0001)	0.0123(0.0160)	0.0205(0.0447)	0.0272(0.0782)	0.0072(0.0055)
$\nu_{40}(0.0733)$	-0.0034(0.0011)	0.0140(0.0182)	0.0321(0.0962)	0.0312(0.0903)	0.0312(0.0909)	0.0007(0.0001)
$\nu_{45}(0.0830)$	-0.0071(0.0037)	-0.0259(0.0487)	-0.0231(0.0387)	-0.0289(0.0608)	-0.0237(0.0409)	-0.0200(0.0290)
$\nu_{47}(0.0843)$	0.0052(0.0019)	-0.0004(0.0001)	0.0056(0.0022)	0.0064(0.0028)	0.0046(0.0015)	0.0163(0.0188)
$\nu_{55}(0.1038)$	0.0067(0.0021)	-0.0047(0.0010)	0.0031(0.0004)	0.0053(0.0013)	0.0122(0.0069)	0.0124(0.0071)
$\nu_{58}(0.1152)$	-0.0003(0.0001)	-0.0117(0.0052)	-0.0002(0.0001)	-0.0118(0.0053)	-0.0039(0.0006)	-0.0168(0.0106)
$\nu_{62}(0.1222)$	0.0024(0.0002)	0.0116(0.0045)	0.0149(0.0074)	0.0132(0.0059)	0.0214(0.0153)	0.0112(0.0042)
$\nu_{69}(0.1285)$	-0.0185(0.0104)	-0.0134(0.0054)	-0.0148(0.0066)	-0.0117(0.0042)	-0.0036(0.0004)	0.0042(0.0005)
$\nu_{73}(0.1405)$	0.0377(0.0360)	-0.0078(0.0015)	-0.0321(0.0261)	-0.0329(0.0273)	-0.0293(0.0218)	0.0060(0.0009)
$\nu_{77}(0.1497)$	0.0100(0.0022)	0.0299(0.0199)	0.0215(0.0103)	0.0196(0.0086)	0.0195(0.0085)	0.0331(0.0244)
$\nu_{82}(0.1582)$	-0.0994(0.1974)	-0.1051(0.2207)	-0.1074(0.2306)	-0.1203(0.2891)	-0.1223(0.2989)	-0.0982(0.1929)
$\nu_{85}(0.1698)$	0.0406(0.0286)	0.0250(0.0108)	0.0102(0.0018)	-0.0096(0.0016)	-0.0025(0.0001)	0.0299(0.0155)
$\nu_{86}(0.1718)$	0.0592(0.0594)	0.0438(0.0325)	0.0358(0.0217)	0.0478(0.0387)	0.0430(0.0314)	0.0610(0.0630)
$\nu_{91}(0.1723)$	-0.0103(0.0018)	0.0162(0.0044)	0.0336(0.0190)	0.0361(0.0219)	0.0357(0.0215)	0.0032(0.0002)
$\nu_{98}(0.1830)$	0.0032(0.0002)	-0.0042(0.0003)	-0.0085(0.0011)	-0.0111(0.0019)	-0.0094(0.0013)	-0.0048(0.0003)
$\nu_{102}(0.1841)$	-0.0077(0.0009)	-0.0185(0.0050)	-0.0290(0.0124)	-0.0312(0.0144)	-0.0277(0.0113)	-0.0084(0.0010)
$\nu_{105}(0.1901)$	0.0438(0.0265)	0.0084(0.0010)	0.0333(0.0153)	0.0293(0.0119)	0.0282(0.0110)	-0.0374(0.0194)
$\nu_{110}(0.2057)$	0.1369(0.2215)	0.0685(0.0554)	0.0947(0.1060)	0.0912(0.0982)	0.1031(0.1256)	0.0226(0.0060)
$\nu_{114}(0.2183)$	-0.0484(0.0246)	-0.0700(0.0514)	-0.0850(0.0757)	-0.1099(0.1267)	-0.1197(0.1504)	-0.0371(0.0144)
$\nu_{118}(0.3766)$	0.0062(0.0001)	-0.0028(0.0001)	-0.0039(0.0001)	-0.0022(0.0001)	-0.0029(0.0001)	0.0015(0.0001)
$\nu_{121}(0.3848)$	-0.0011(0.0001)	-0.0004(0.0001)	-0.0010(0.0001)	-0.0015(0.0001)	0.0004(0.0001)	-0.0009(0.0001)
$\nu_{126}(0.3890)$	0.0010(0.0001)	-0.0060(0.0001)	-0.0068(0.0002)	-0.0064(0.0001)	-0.0068(0.0002)	-0.0001(0.0001)
$\nu_{128}(0.3984)$	0.0023(0.0001)	0.0018(0.0001)	0.0004(0.0001)	0.0004(0.0001)	0.0016(0.0001)	0.0031(0.0001)
$\nu_{132}(0.4005)$	-0.0036(0.0001)	-0.0013(0.0001)	0.0001(0.0001)	0.0003(0.0001)	-0.0005(0.0001)	-0.0042(0.0001)

Table S15: Linear interstate coupling parameters (λ) for singlet electronic states of **AP4** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength $(\lambda^2/2\omega^2)$ obtained for each vibrational mode is shown in paranthesis.

NUM Contribution	ional mode eg. eV)	$^{\lambda S_1-S_2}$	$^{\lambda S_1-S_3}$	$\lambda S_1 - S_4$	$^{\lambda S_1-S_6}$	$^{\lambda S_2 - S_3}$	$^{\lambda S_2 - S_4}$	$\lambda S_2 - S_5$	$^{\lambda S_3-S_4}$	$^{\lambda S_3-S_5}$	$^{\lambda S_3-S_6}$	$\lambda S_4 - S_5$	$\lambda S_4 - S_6$	$^{\lambda S_5}$
0000 00001 000000000000000000000000000000000000	0.0037)					0.0014(0.0732)		i				0.0106(4.0958)		
Matrix Matrix<	0.0050)	,		,	,	. 1	,	,	,	0.0053(0.5535)	,	. 1	0.0097(1.8998)	
Matrix Matrix<	0.0065)	0.0087(0.8957)			0.0161(3.0718)									0.0060(
Mail Mail <th< td=""><td>0.0067)</td><td>,</td><td>0.0096(1.0216)</td><td>,</td><td></td><td></td><td></td><td></td><td>,</td><td>,</td><td></td><td>1</td><td>0.0003(0.0011)</td><td></td></th<>	0.0067)	,	0.0096(1.0216)	,					,	,		1	0.0003(0.0011)	
1 1	0.0070)	-										0.0209(4.4734)		1 10 0
Main Main <th< td=""><td>(2710.0</td><td>(RENT-N)NONN-N</td><td>(moor 0/moor 0</td><td></td><td>0.0291(2.0595)</td><td></td><td></td><td></td><td>(1700.0)0710.0</td><td>- 000000</td><td></td><td></td><td></td><td>n)ettn.u</td></th<>	(2710.0	(RENT-N)NONN-N	(moor 0/moor 0		0.0291(2.0595)				(1700.0)0710.0	- 000000				n)ettn.u
(1) (1) <td>(1610.0</td> <td></td> <td>(/701.0)/00000</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>(\$#TN'N)\$7NN'N</td> <td>- 0.0061/0.0596)</td> <td>(6000 0/2600 0</td> <td></td> <td></td>	(1610.0		(/701.0)/00000							(\$#TN'N)\$7NN'N	- 0.0061/0.0596)	(6000 0/2600 0		
000100 000100 000100 000100 000100 000100 000100 000100 000100 000100 000100 000100 000100 000100 0001000 0001000 0001000 0001000 0001000 00010000 00000000 00000000 00	(00100)		- 0,0100/0 1469)								(0700.0)T000.0	(cenn.u)uzuu.u	- 00001/0000	
00001 00001 00001 00001 00001 00001000 000010000 000010000 000010000 000010000 000001000 0000010000 0000010000 00000100000 0000000000 0000000000 00000000000 000000000000000 000000000000000000000000000000000000	(0610-0		(70%T.0)70T070			(9900 078700 0							(10/00)1/0000	
0.0010 0.0010<	0.0207)	0 0061/0 0434)			0.0108/0.1361)	[0.0006/0.1070)			-		0.00300
0000 000000 00000 00000 <th< td=""><td>0.0217)</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0.0173(0.3160)</td><td></td><td></td><td>0.0187(0.3696)</td><td></td></th<>	0.0217)	-								0.0173(0.3160)			0.0187(0.3696)	
0000 000000000 000000000 0000000000 0000000000 0000000000 0000000000 0000000000 </td <td>0.0242)</td> <td>0.0051/0.0222)</td> <td></td> <td></td> <td>0 0097/0 0796)</td> <td></td> <td></td> <td></td> <td>0.0077(0.0508)</td> <td></td> <td></td> <td></td> <td></td> <td>0.0015/</td>	0.0242)	0.0051/0.0222)			0 0097/0 0796)				0.0077(0.0508)					0.0015/
000000000000000000000000000000000000	0.0260)	(7770)T0000			(neinn) iennin	. 0 0000/0/0/0/0/			(0000.0) / /00.0			- 0.0081(0.0484)		leton.o
0.0010 0.0010(0.001	0.0299)		0.0129(0.0929)							0.0069(0.0263)			0.0189(0.2005)	
0.0010 0.0010<	0.0343)	0.0087(0.0322)		,	0.0335(0.4782)		,	,	,		,			0.0125/
0.0000 0.000100000 0.000100000 0.0001000	0.0378)	0.0176(0.1084)	,	,	0.0333(0.3871)	,	,	,	0.0114(0.0452)	,	,	,	,	0.0020(
0.011 0.029(0.10) 0.024(0.10) 0.024(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.014(0.00) 0.000(0.00) <th< td=""><td>0.0393)</td><td>, 1</td><td>0.0068(0.0151)</td><td>,</td><td>~ 1</td><td>,</td><td>0.0079(0.0201)</td><td></td><td>, 1</td><td>0.0097(0.0303)</td><td>,</td><td>,</td><td></td><td></td></th<>	0.0393)	, 1	0.0068(0.0151)	,	~ 1	,	0.0079(0.0201)		, 1	0.0097(0.0303)	,	,		
1 1	0.0410)		. 1			0.0040(0.0046)	. 1			. 1		0.0049(0.0071)	,	
0111 01240 012440 01240 01240 <th< td=""><td>0.0432)</td><td>,</td><td>0.0208(0.1156)</td><td>,</td><td>,</td><td>. 1</td><td>0.0126(0.0427)</td><td>,</td><td>,</td><td>,</td><td>,</td><td>. 1</td><td></td><td></td></th<>	0.0432)	,	0.0208(0.1156)	,	,	. 1	0.0126(0.0427)	,	,	,	,	. 1		
0.00210 0.0030(0.0120) 0.0030(0.012) 0.0030(0.0120) 0.0030(0.0120) 0.0030(0.0120) 0.0030(0.0120) 0.0030(0.0120) 0.0030(0.0120) 0.0030(0.0120) 0.0030(0.0120) 0.0030(0.0120)<	0.0471)	,	~ 1	0.0216(0.1050)	,	0.0100(0.0227)	~ 1		,	,	,	0.0020(0.0009)		
0.0123 0.0123 (0.014) 0.0123 (0.014) 0.0123 (0.014) 0.0131 (0.014)<	(0.0472)	0.0236(0.1250)			0.0393(0.3460)				0.0095(0.0204)					0.0051
0.0124 0.0124 0.0134<	(0.0574)	. 1	0.0224(0.0765)	,	. 1	,	0.0162(0.0397)	,	. 1	,	,	,	,	
0.0030 0.0030(0000)	(0.0609)	,		,	,	0.0071(0.0068)		,	,	,	,	0.0181(0.0444)	,	
0.0024 0.0242(0.0284) 0.0440(0.2343) 0.0440(0.2343) 0.0440(0.2343) 0.0440(0.2343) 0.0227(0.034) 0.0237(0.034) 0.0132 0.0131 0.0312(0.014) 0.0440(0.2343) 0.0440(0.2343) 0.0442(0.2343) 0.0442(0.0243) 0.0432(0.0043) 0.0132 0.0131 0.0131(0.014) 0.0440(0.0243) 0.0442(0.0243) 0.0132(0.013) 0.0132(0.0143)	0.0632)	0.0122(0.0186)	,	,	0.0258(0.0831)	, 1	,	,	0.0088(0.0096)	,	,	~ 1		0.0028
0.00010 0.000120440 0.000120440 0.000120440 0.000120440 0.000120400 0.000120000 0.00012000 0.00012000	(0.0652)	0.0242(0.0689)		,	0.0450(0.2377)		,	,	, 1					0.0076
0.0005(0.0014) 0.0404(0.014) 0.0404(0.014) 0.0434(0.014) 0.0132(0.032) 0.0032(0.032) 0.0132(0.032) 0.0132(0.032) 0.0132(0.032) 0.0132((0.0658)			,		,	,	,		0.0312(0.1123)	,	,	0.0227(0.0594)	
0.0131 0.0131 (0.14) 0.0487 (0.237) 0.0487 (0.237) 0.0487 (0.237) 0.0487 (0.237) 0.0487 (0.237) 0.012 (0.0137) 0.0187 (0.0137) 0.0187 (0.0137) 0.0187 (0.0137) 0.0137 (0.0137) 0.0017 (0.0137) 0.0017 (0.0137) 0.0017 (0.0137) 0.0017 (0.0137) 0.0017 (0.0137) 0.0017 (0.0137) 0.0017 (0.0137) 0.0017 (0.0131) 0.0017 (0.0131) 0.0017 (0.0131) 0.0017 (0.0131) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113) 0.0014 (0.0113)	0.0673)	0.0036(0.0014)	,	,	0.0490(0.2648)	,	,	,	,		,	,		0.0192
0.0131 0.0131(0.014) 0.0432(0.013) 0.0032(0.013) </td <td>(0.0712)</td> <td></td> <td>ı</td> <td>ı</td> <td></td> <td>,</td> <td>,</td> <td>ı</td> <td>,</td> <td>,</td> <td>0.0182(0.0325)</td> <td>(0.0089(0.0078))</td> <td>ı</td> <td></td>	(0.0712)		ı	ı		,	,	ı	,	,	0.0182(0.0325)	(0.0089(0.0078))	ı	
0.0013 0.0014(0.014) 0.0136(0.014) 0.0032(0.000) 0.0032(0.001) </td <td>(0.0731)</td> <td></td> <td></td> <td>,</td> <td>0.0482(0.2175)</td> <td></td> <td>,</td> <td>0.0207(0.0401)</td> <td>,</td> <td>,</td> <td>(<u></u></td> <td></td> <td></td> <td>0.0174</td>	(0.0731)			,	0.0482(0.2175)		,	0.0207(0.0401)	,	,	(<u></u>			0.0174
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(0.0759)		0.0131(0.0149)					(+0+0.0)		0 0043(0 0016)			0.0032/0.0000	
0.0333 0.0440(0.014) 0.033(0.005) 0.0440(0.014) 0.0340(0.004) 0.0340(0.004) 0.0340(0.004) 0.037(0.001) 0.037(0.001) </td <td>0.0764)</td> <td></td> <td></td> <td></td> <td></td> <td>0.0186(0.0297)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.0188(0.0304)</td> <td>(2000-0)=200-0</td> <td></td>	0.0764)					0.0186(0.0297)						0.0188(0.0304)	(2000-0)=200-0	
0.001 0.0132(0.007) 0.0132(0.007) 0.0132(0.007) 0.0132(0.007) 0.0032(0.001) 0.0032(0.001) <td>0.0813)</td> <td></td> <td></td> <td></td> <td></td> <td>0.0120(0.020)</td> <td></td> <td></td> <td></td> <td></td> <td>0 0044(0 0014)</td> <td>0.0286(0.0618)</td> <td></td> <td></td>	0.0813)					0.0120(0.020)					0 0044(0 0014)	0.0286(0.0618)		
0.0030 0.0030(0.006) 0.0030(0.006) 0.0030(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0100(0.006) 0.0000(0.016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0100(0.0016) 0.0100(0.0016) 0.0100(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.016) 0.0010(0.0016) 0.0010(0.0016) 0.0010(0.016) 0.00110(0.016) 0.00110(0.016)	0.0817)						0.0031(0.0007)			0.0139/0.0146)			0.0057(0.0024)	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(1100.0	ı	ı	ı	(9000 0/0600 0	I	(10000) 10000	I		(0110.0) 0010.0	I	I	(1700.0) 1000.0	02000
0.0102 (0.067) 0.0326 (0.058) 0.0143 (0.067) 0.0326 (0.053) 0.0046 (0.026) 0.0046 (0.026) 0.0046 (0.026) 0.0110 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.077) 0.0010 (0.071) 0.0010 (0.071) 0.0010 (0.071) 0.0010 (0.071) 0.0014 (0.011) 0.0014	0.0881)					- 0.0169(0.0168)						- 		6100.0
0.0012 0.0044(0.011) 0.0044(0.011) 0.0044(0.011) 0.0012(0.003) 0.0134(0.001) 0.0068(0.003) 0.0116(0.003) 0.0013(0.003) 0.0014(0.011) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) 0.0014(0.001) </td <td>(1000.0</td> <td>0 0109/0 0067</td> <td>ı</td> <td>ı</td> <td>0 0005/0 0559)</td> <td>(00100)=0100</td> <td>I</td> <td>I</td> <td>(9600 0/800 0</td> <td>ı</td> <td>I</td> <td>(00000)==1000</td> <td>I</td> <td>0.0105/</td>	(1000.0	0 0109/0 0067	ı	ı	0 0005/0 0559)	(00100)=0100	I	I	(9600 0/800 0	ı	I	(00000)==1000	I	0.0105/
0.0038() . 0.004(0.0011) . 0.0048(0.0023) 0.0068(0.0023) 0.0068(0.0023) 0.0068(0.0023) 0.0008(0.0011) . 0.0008(0.0011) . 0.0008(0.0011) . 0.0008(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011) . 0.0014(0.0011)	0.0000)	(/00000)Z01000			(seeu.u)e8zu.u	- 00000 0/02000			07007(0700)			-) entro
$ \begin{array}{ c c c c c c c c c c c c c c c c c c $	0.0909)					0.0072(0.0032)	- 0140/0140/0			- 0000 0/0000		(e/nn/n/nttn/n		
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	0.0910)		1				0.0140(0.0118)			0.0068(0.0028)			1	
$ \begin{array}{ ccccccccccccccccccccccccccccccccccc$	0.0943)		0.0044(0.0011)	,	1	,	0.0132(0.0099)	1	1	0.0105(0.0062)	,	,	0.0003(0.0001)	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c $	0.1013)	0.0098(0.0047)			0.0088(0.0037)			0.0052(0.0013)	0.0068(0.0023)					
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	(0.1032)			,		0.0132(0.0082)		,				0.0049(0.0011)		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(0.1046)	,	0.0127(0.0074)	,	,		,	,	,	,	,		0.0011(0.0001)	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	0.1098)	0.0090(0.0034)	,	,	0.0209(0.0181)	,	,	,	0.0184(0.0140)	,	,	,	,	0.0024(
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(0.1174)	,	0.0179(0.0116)	,	,		0.0095(0.0033)	,		,	,	,	,	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(0.1194)	0.0106(0.0039)		,	0.0039(0.0005)				0.0138(0.0067)		,			
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(0.1210)	,	,	0.0173(0.0102)	,	0.0053(0.0010)	,	,		,	0.0063(0.0014)	,	,	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1228)	0.0135(0.0060)		,	0.0268(0.0239)				0.0058(0.0011)		,			0.0051(
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1230)					0.0042(0.0006)					0.0079(0.0021)	0.0015(0.0001)		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1240)		0.0136(0.0060)										0.0037(0.0005)	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(0.1249)	0.0187(0.0112)	ı	ı	0.0356(0.0406)	ŗ	ı	ı	0.0111(0.0040)	,	,	,	ı	0.00800
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1282)	,	1	,		0.0069(0.0014)	ı	ı	,	,		0.0016(0.0001)		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1283)	,	0.0039(0.0005)	,		,	0.0111(0.0038)	ı	,	0.0125(0.0048)		,	0.0029(0.0003)	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1287)	,	0.0060(0.0011)	,	,	,	,	,	,	,	,		0.0040(0.0005)	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1289	0.0050(0.0008)			0.0169(0.0086)									0.0079(
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1339)					0.0138(0.0053)					0.0173(0.0083)	0.0238(0.0159)		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1412)				0.0174(0.0076)			0.0043(0.0005)	0.0169(0.0072)					0.0062(
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0.1489)	1		,	1			1	1	0.0282(0.0179)			0.0180(0.0073)	
0.1506) 0.0123(0.01026) 0.01223(0.0110) - 0.01508) - 0.0173(0.0066) - 0.01223(0.0160(0.0057) - 0.01508)	0.1492)	0.0059(0.0008)	ı	ı	0.0366(0.0302)	,	,	0.0166(0.0062)	0.0234(0.0123)				ı	0.0116(
0.1508) 0.0173(0.0066) 0.0173	0.1506)			,	,	ı	,	,			0.0109(0.0026)	0.0223(0.0110)	-	
	0.1508)			'	'	·				0.0173(0.0066)	'		0.0160(0.0057)	'

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- 0.0011(0	0.0011(0
0.0079(0.0002)	
	'
0.0096/0.001)	

Table S16: Linear intrastate coupling parameters (κ) for triplet electronic states of **AP4** obtained at B3LYP/6-311G(d,p) level of theory. Coupling strength ($\kappa^2/2\omega^2$) obtained for each vibrational mode is shown in parameters.

AG mode	κ^{T_1}	κ^{T_2}	κ^{T_3}	κ^{T_4}	κ^{T_5}	κ^{T_6}
(Freq, eV)						
$\nu_3(0.0065)$	-0.0173(3.5567)	-0.0279(9.2053)	-0.0291(10.0145)	-0.0297(10.4659)	-0.0354(14.8680)	-0.0405(19.4491)
$\nu_7(0.0098)$	-0.0030(0.0462)	0.0035(0.0647)	-0.0058(0.1762)	-0.0042(0.0935)	-0.0017(0.0159)	-0.0054(0.1505)
$\nu_{10}(0.0179)$	-0.0096(0.1438)	-0.0071(0.0778)	-0.0044(0.0308)	-0.0016(0.0038)	-0.0008(0.0011)	-0.0015(0.0034)
$\nu_{15}(0.0212)$	-0.0048(0.0256)	0.0087(0.0841)	0.0090(0.0909)	0.0098(0.1068)	0.0112(0.1396)	0.0103(0.1185)
$\nu_{20}(0.0338)$	0.0115(0.0580)	-0.0152(0.1005)	0.0024(0.0026)	-0.0082(0.0298)	0.0074(0.0240)	0.0091(0.0361)
$\nu_{22}(0.0343)$	0.0211(0.1898)	-0.0030(0.0038)	-0.0015(0.0010)	-0.0004(0.0001)	-0.0038(0.0061)	0.0069(0.0202)
$\nu_{29}(0.0482)$	0.0289(0.1802)	0.0036(0.0028)	0.0142(0.0434)	0.0129(0.0359)	0.0075(0.0121)	0.0028(0.0017)
$\nu_{32}(0.0620)$	0.0314(0.1286)	0.0029(0.0011)	0.0172(0.0387)	0.0178(0.0410)	0.0109(0.0154)	-0.0322(0.1347)
$\nu_{37}(0.0687)$	-0.0118(0.0148)	-0.0101(0.0108)	0.0087(0.0080)	0.0085(0.0077)	0.0241(0.0614)	0.0150(0.0239)
$\nu_{40}(0.0733)$	-0.0017(0.0003)	-0.0021(0.0004)	0.0204(0.0389)	$0.0126\ (0.0148)$	0.0197(0.0361)	0.0093(0.0081)
$\nu_{45}(0.0830)$	0.0024(0.0004)	-0.0239(0.0415)	-0.0247(0.0443)	-0.0311(0.0701)	-0.0269(0.0523)	-0.0145(0.0152)
$\nu_{47}(0.0843)$	0.0076(0.0041)	-0.0014(0.0001)	0.0023(0.0004)	0.0040(0.0011)	0.0078(0.0043)	0.0212(0.0316)
$\nu_{55}(0.1038)$	0.0166(0.0127)	-0.0066(0.0020)	0.0007(0.0001)	0.0019(0.0002)	0.0046(0.0010)	0.0115(0.0062)
$\nu_{58}(0.1152)$	0.0092(0.0032)	-0.0305(0.0350)	-0.0061(0.0014)	-0.0124(0.0058)	-0.0096(0.0035)	-0.0175(0.0116)
$\nu_{62}(0.1222)$	0.0029(0.0003)	0.0095(0.0030)	0.0084(0.0024)	0.0013(0.0001)	0.0117(0.0046)	0.0193(0.0125)
$\nu_{69}(0.1285)$	-0.0185(0.0103)	-0.0126(0.0048)	-0.0172(0.0090)	-0.0186(0.0105)	-0.0074(0.0017)	0.0033(0.0003)
$\nu_{73}(0.1405)$	0.0532(0.0717)	0.0104(0.0027)	-0.0234(0.0139)	-0.0147(0.0054)	-0.0293(0.0217)	-0.0119(0.0036)
$\nu_{77}(0.1497)$	0.0131(0.0039)	0.0315(0.0221)	0.0181(0.0073)	0.0113(0.0029)	0.0155(0.0054)	0.0259(0.0150)
$\nu_{82}(0.1582)$	-0.1426(0.4065)	-0.1051(0.2207)	-0.0920(0.1691)	-0.0857(0.1466)	-0.0976(0.1902)	-0.0988(0.1950)
$\nu_{85}(0.1698)$	0.0689(0.0823)	0.0139(0.0034)	-0.0039(0.0003)	-0.0240(0.0100)	-0.0141(0.0035)	0.0165(0.0047)
$\nu_{86}(0.1718)$	0.0762(0.0985)	0.0478(0.0386)	0.0280(0.0132)	0.0372(0.0234)	0.0306(0.0159)	0.0535(0.0486)
$\nu_{91}(0.1723)$	-0.0132(0.0029)	0.0063(0.0007)	0.0260(0.0114)	0.0227(0.0087)	0.0286(0.0138)	0.0126(0.0027)
$\nu_{98}(0.1830)$	0.0042(0.0003)	-0.0021(0.0001)	-0.0069(0.0007)	-0.0080(0.0010)	-0.0078(0.0009)	-0.0057(0.0005)
$\nu_{102}(0.1841)$	-0.0080(0.0009)	-0.0116(0.0020)	-0.0216(0.0069)	-0.0208(0.0064)	-0.0216(0.0069)	-0.0137(0.0028)
$\nu_{105}(0.1901)$	0.0675(0.0630)	-0.0058(0.0005)	0.0270(0.0101)	0.0338(0.0158)	0.0221(0.0068)	-0.0141(0.0028)
$\nu_{110}(0.2057)$	0.2153(0.5478)	0.0487(0.0281)	0.0778(0.0716)	0.0658(0.0511)	0.0752(0.0667)	0.0305(0.0110)
$\nu_{114}(0.2183)$	-0.0222(0.0052)	-0.0814(0.0695)	-0.1162(0.1418)	-0.1411(0.2088)	-0.1324(0.1838)	-0.0624(0.0408)
$\nu_{118}(0.3766)$	0.0020(0.0001)	-0.0001(0.0001)	-0.0011(0.0001)	0.0024(0.0001)	-0.0004(0.0001)	0.0006(0.0001)
$\nu_{121}(0.3848)$	-0.0009(0.0001)	-0.0004(0.0001)	-0.0001(0.0001)	-0.0011(0.0001)	0.0001(0.0001)	-0.0010(0.0001)
$\nu_{126}(0.3890)$	0.0009(0.0001)	-0.0044(0.0001)	-0.0073(0.0002)	-0.0052(0.0001)	-0.0077(0.0002)	-0.0018(0.0001)
$\nu_{128}(0.3984)$	0.0024(0.0001)	-0.0001(0.0001)	0.0012(0.0001)	$0.0018\ (0.0001)$	0.0020(0.0001)	-0.0028(0.0001)
$\nu_{132}(0.4005)$	-0.0044(0.0001)	-0.0026(0.0001)	0.0005(0.0001)	0.0001(0.0001)	0.0003(0.0001)	-0.0035(0.0001)

l,p)		$\lambda T_5 - T$
/6-311G(d		$^{\lambda T_4-T_6}$
at B3LYP	esis.	$\lambda_{T_4-T_5}$
btained a	paranth	$^{\lambda}T_{3}-T_{6}$
f AP4 o	shown in	$^{\lambda}T_{3}-T_{5}$
c states o	mode is	$^{\lambda T_{3}-T_{4}}$
electroni	orational	$^{\lambda}T_2 - T_5$
r triplet	· each vib	$^{\lambda}T_2-T_4$
ters (λ) for	tained for	$^{\lambda}T_2-T_3$
g paramet	$/2\omega^2$) obt	$^{\lambda}T_{1}-T_{6}$
coupling	ngth (λ^2)	$^{\lambda}T_{1}-T_{4}$
nterstate	oling stre	$^{\lambda T_{1}-T_{3}}$
: Linear i	ory. Coul	$^{\lambda T_{1}-T_{2}}$
Table S17.	level of the	Vibrational mode (Freq. eV)

ational mode	$\lambda_{T_1-T_2}$	$\lambda_{T_1-T_3}$	$^{\lambda_{T_1-T_4}}$	$^{\lambda T_1 - T_6}$	$\lambda_{T_2-T_3}$	$^{\lambda_{T_2-T_4}}$	$^{\lambda}T_2 - T_5$	$\lambda_{T_3-T_4}$	$\lambda_{T_3-T_5}$	$\lambda_{T_3-T_6}$	$\lambda_{T_4-T_5}$	$^{\lambda T_4 - T_6}$	$^{\lambda}T_5 - T_6$
(Freq, eV)													
$_{1}^{(0.0037)}$											0.0091 (3.0245)	-	
2(0.0050)								-	0.0092(1.6928)			0.0111 (2.4642)	
4(0.005m)								U.UU09 (U.2034)	- 0000 0/2000 0				(#Z6C'T) 0TTD'D
5(0.0070)									(7100.0)/700.0		- 0.0163 (9.7111)		
6(0.0070) 6(0.0128)	- 0.0251/1.0226)			0.0567 (0.8111)				0.0115 (0.4036)			(TTT1/7) 00T0/0		0.0163 (0.8108)
S(0.0121)		0.0190/1.0518)						(0001-0) 011000					-
9(0.0188)		-			0.0052 (0.0383)				, ,	0.0060(0.0509)	0.0022 (0.0068)		
2 (0.0190)	,	0.0200(0.5540)	,	,	~ 1	,	,	,	,	, I	~ 1	0.0083 (0.0954)	,
3(0.0207)	,	, 1	,	,	,	,	,	,	,	0.0017(0.0034)	$0.0084 \ (0.0823)$	· ·	,
$_{4}^{(0.0207)}$	0.0156(0.2840)		,	0.0237 (0.6554)				0.0050 (0.0292)	,				0.0072 (0.0605)
6(0.0217)	,	,	,		,	ı	,	,	0.0153(0.2486)	,		0.0167 (0.2961)	,
7(0.0242)	0.0136(0.1579)		,	0.0108(0.0996)				0.0026(0.0058)		,			0.0014 (0.0017)
$_{8}(0.0260)$,	,	0.0305(0.6881)		0.0069 (0.0352)	ı	,	,	,	0.0022(0.0036)		,	,
9(0.0299)	,	0.0203(0.2305)	,		ı	ı	,	,	0.0070(0.0274)	,		0.0175(0.1713)	,
21(0.0343)	0.0354(0.5326)	,	ı	0.0652(1.8067)	ı	,		0.0070 (0.0208)	,	ı		,	0.0155 (0.1021)
23(0.0378)		,	,	0.0211 (0.1558)	,		0.0150(0.0787)	0.0128(0.0573)	,	,	,	,	0.0023 (0.0019
$_{24}(0.0393)$		0.0227(0.1668)	,	,	,	0.0042 (0.0057)	,	,	0.0055(0.0098)	,	,	,	,
$_{25}(0.0410)$,	0.0086(0.0220)						0.0045(0.0060)	,	
26 (0.0432)		0.0190(0.0967)	,			0.0224(0.1344)	,		0.0110(0.0324)	,			,
27(0.0471)	,	. 1	0.0162(0.0592)	,	0.0195(0.0857)	· 1	,	,	. 1	,	0.0088(0.0175)	,	,
0.0472)	0.0293(0.1927)		~ 1	0.0204 (0.0934)	~ 1			0.0194 (0.0845)			~ 1		
20 (0.0574)		0.0293(0.1303)	,			0.0166(0.0418)	,						
(0.0609)			,		0.0080(0.0086)	~ 1	,				0.0137 (0.0253)		
(0.0632)	0.0291(0.1060)		,	0.0453 (0.2569)				0.0039 (0.0019)	,	,		,	0.0073 (0.0067
33 (0.0659)	(0001.0)104000			0.0561 (0.2003)				0.0103 (0.0125)					20000) 00000
34 (0.0002)	0.0424(0.2114)			(Znien) Toenn				(eztan) entan	- 001000			- 0100 (0.04F0)	0.0000 (0.004
55(U.U038)	- 0000/00000			- 0 0669 (0 4969)				- 0000 0/ 6/000	(#een.u)&12U.u			(cc+n.n) setun	- 00007 /0 0728
(e 100.0) 93	(01000)000000							(n=nn.n) e=nn.n		- 0148/0 0016	- 0000		0.0201 (0.041.
(2110.0)8							•	- 0122 (00000)		(0170.0)0#10.0	(ZANANA) ETANA		
39 (0.0731)				0.0895 (0.7495)		1 1 1 0 0 0		0.0177 (0.0293)					0.0278 (0.0723
(662.0.0) I				i	,	0.0055 (0.0026)						ı	
2 (0.0764)					0.0200 (0.0343)						0.0152 (0.0198)		
3(0.0813)				i						0.0169(0.0216)	0.0254 (0.0488)	1	
$_{.4}(0.0817)$									0.0191(0.0273)			0.0104 (0.0081)	
6(0.0842)							0.0140(0.0138)						
$_{8}(0.0881)$					0.0187 (0.0225)						0.0137 (0.0121)		
9(0.0883)	0.0159(0.0162)			0.0508(0.1655)				0.0100(0.0064)					0.0137 (0.0120
(0.0909)			0.0343(0.0712)		0.0123(0.0092)						0.0062 (0.0023)		
(0.0910)	,	0.0172(0.0179)	. 1	,	- 1	0.0166(0.0166)	,	,	0.0015(0.0001)	,	· 1	,	,
o (0.0943)	,	, 1	,	,	,	0.0202(0.0229)		,	0.0163(0.0149)	,	,	,	,
e (0.1013)	0.0146(0.0104)	,	,	0.0131 (0.0084)	,	~ 1	0.0175(0.0149)	,	, 1	,	,	,	,
3 (0.1032)			0.0346(0.0562)		0.0121 (0.0069)			,	,	,	0.0013 (0.0001)	,	,
4 (0.1046)		0.0324(0.0480)				0 0108 (0 0053)			0.0017/0.0001				,
6 (0.1040) - (0.1098)				0 0379 (0 0574)			0.0122/0.0062	0 0294 (0 0358)	-				0 0000 /0 003
7 (0.1174)				(* 100:0) * 100: 0			(**********		0.0190/0.0131)			0 0165 (0 0099)	-
9 (0 1194)	0.0080/0.0020			0 0361 (0 0457)				0.0127 (0.0057)					0 0104 (0 0035
0 (0 1210)					0 0129 (0 0057)						0.0071 (0.0017)		-
(01771) T	0 0909/0 0819)	•		0 0481 (0 0767)	(1000.0) 0710.0	•	0.0050/0.0019)	0.0050 (0.0010)		•	(11000) 11000		,
3(0.1220)	(ZIGU.U)686U.U			(1010.0) TOPO.0			(7T00.0)8000.0	(7TAAA) @0000					
4(0.1230)		-	0.0432(0.0617)		0.0082 (0.0022)								'
5(0.1240)		0.0109(0.0039)		1							,	0.0095 (0.0029)	
6(0.1249)	0.0197(0.0124)		,	0.0218(0.0152)	1			0.0109(0.0038)	,	,	1		0.0061 (0.0012
$_{7}(0.1282)$					0.0124 (0.0047)						0.0091 (0.0025)		,
$_{8}(0.1283)$		0.0144(0.0063)				0.0126(0.0048)			0.0065(0.0013)				
$_{0}(0.1287)$												0.0033 (0.0003)	
1(0.1289)				0.0081 (0.0020)				0.0051 (0.0008)					0.0074 (0.0016
2(0.1339)	,	,	,	,	,			,	,	0.0258(0.0186)	$0.0164 \ (0.0075)$,	,
$_{4}(0.1412)$	0.0190(0.0091)		,	0.0342(0.0293)	,			0.0091 (0.0021)	1	,	,	, .	0.0074 (0.0014
5(0.1489)				1.1					0.0263(0.0156)			$0.0244 \ (0.0134)$	1.
6(0.1492)				0.0708 (0.1126)				0.0226(0.0115)					0.0227 (0.0116
$_{8}(0.1506)$,	,		,	,	,			0.0114(0.0029)	0.0193 (0.0082)		,
$_{9}(0.1508)$									0.0144(0.0046)			0.0274 (0.0165)	
n(0.1544)						0.0237 (0.0118)			0.0511(0.0548)			0.0154 (0.0050)	

0.0319 (0.0212)		,	0.0257 (0.0112)	,	0.0146(0.0036)		,		0.0106(0.0018)	0.0038 (0.0002)	· 1			0.0072 (0.0008)				0.0153(0.0032)		0.0318 (0.0128)		0.0318(0.0128)			0.0015 (0.0001)				0.0015 (0.0001)		0.0026(0.0001)	,	,	,	0.0016(0.0001)		,
		0.0128 (0.0030)	·	·		0.0136(0.0031)			,	,		$0.0084 \ (0.0011)$,	0.0074 (0.0008)								0.0578(0.0352)				0.0039(0.0001)		,	0.0044 (0.0001)	,	,	,	,			0.0024(0.0001)
,	0.0466(0.0031)		,	0.0141 (0.0034)			,	0.0228 (0.0085)	· ·		0.0090 (0.0012)		0.0127 (0.0024)			0.0076 (0.0008)			0.0189(0.0046)					0.0993 (0.1038)		0.0017 (0.0001)		0.0022 (0.0001)				0.0068 (0.0002)		0.0029 (0.0001)		0.0017 (0.0001)	T
,		,	·	0.0103(0.0018)			,		,	,				,										0.0593(0.0370)		0.0003(0.0001)		0.0009(0.0001)	,		,	,	,	0.0049(0.0001)		0.0033(0.0001)	ı
,						0.0189(0.0060)	0.0059(0.0006)		,	,		0.0071(0.0008)			0.0063(0.0006)		0.0298(0.0125)				0.0351(0.0148)		0.0962(0.0976)						,				0.0067(0.0001)				ı
0.0440(0.0403)			,	,	0.0136(0.0031)		,	,	0.0071 (0.0008)	0.0027 (0.0001)	- 1			0.0055(0.0004)				0.0307 (0.0129)		0.0417 (0.0219)		0.0812 (0.0696)									0.0039 (0.0001)				0.0010 (0.0001)		ı
ı							,	,	,	,												0.0834(0.0734)							,		0.0030(0.0001)				0.0055(0.0001)		ŀ
,		,	,	,			0.0194(0.0063)		,	,				,			0.0317 (0.0141)				0.0489 (0.0287)								,		,	,	0.0073 (0.0002)	,			0.0039 (0.0001)
	0.0369(0.0019)	,						0.0131 (0.0028)	· 1	,				,		0.0213 (0.0066)			0.0202(0.0053)					0.0450(0.0213)		0.0025 (0.0001)		0.0032 (0.0001)	,		,	0.0093 (0.0003)	,	,		0.0042 (0.0001)	
0.1146 (0.2737)			0.0992 (0.1667)	,	0.0462(0.0361)		,		0.0402(0.0256)	0.0028 (0.0001)	- 1			0.0163(0.0039)				0.0730(0.0732)		0.1571 (0.3113)		0.1703(0.3060)									0.0127 (0.0005)				0.0011 (0.0001)		ı
,		,	,	,			,	,	,	,				,					0.0506(0.0330)										,		,	,	,	,			ı
,		,					0.0596(0.0594)	. 1	,	,				,			0.0561(0.0441)				0.0459(0.0253)						0.0099(0.0003)	,	,	0.0099(0.0003)	,	,	0.0137(0.0006)	,			0.0152(0.0007)
	,		0.0609(0.0628)						0.0130(0.0027)	, 1				,	,			0.0214(0.0063)		0.1090(0.1499)											,	,	,	,			
$ u_{81}(0.1549) $	$\nu_{83}(0.5920)$	$\nu_{84}^{-1}(0.1658)$	$\nu_{87}(0.1718)$	$\nu_{88}(0.1720)$	$\nu_{89}(0.1720)$	$\nu_{90}(0.1721)$	$\nu_{92}(0.1729)$	$\nu_{03}(0.1749)$	$\nu_{04}(0.1775)$	Vaf (0.1827)	$\nu_{96}(0.1828)$	$\nu_{97}(0.1829)$	$\nu_{99}(0.1840)$	$\nu_{100}(0.1840)$	$\nu_{101}(0.1840)$	$\nu_{103}(0.1851)$	$\nu_{104}(0.1888)$	$\nu_{106}(0.1908)$	$\nu_{107}(0.1971)$	$\nu_{108}(0.1991)$	$\nu_{109}(0.2042)$	$\nu_{111}(0.2177)$	$\nu_{112}(0.2177)$	$\nu_{113}(0.2179)$	$\nu_{115}(0.3766)$	$\nu_{116}(0.3766)$	$\nu_{117}(0.3766)$	$\nu_{119(0.3848)}$	$\nu_{120}(0.3848)$	$\nu_{122}(0.3848)$	$\nu_{123}(0.3890)$	$\nu_{124}(0.3890)$	$\nu_{125}(0.3890)$	$\nu_{127}(0.3984)$	$\nu_{129}(0.3984)$	$\nu_{130}(0.3984)$	$\nu_{131}(0.4005)$

Fig. S2: Adiabatic potential energy curves of singlet electronic states along the dimensionless normal coordinates of C=C stretch vibration (Q_{51}) for P, C=O stretch vibration (Q_{88}) for AP2 and C=O stretch vibration (Q_{114}) for AP4. Computed energies (plus harmonic potential) are shown by the asterisks on each curve.



Fig. S3: Potential energy surfaces of triplet manifold and S_1 along the dimensionless normal coordinates of C=C stretch vibration (Q₈₆) and C=O stretch vibration (Q₈₈) of AP2.



Fig. S4: Potential energy surfaces of triplet manifold and S_1 along the dimensionless normal coordinates of C=C stretch vibration (Q_{105}) and C=O stretch vibration (Q_{114}) of AP4.



Fig. S5: Electronic population decay profiles of singlet manifold of P, AP2 and AP4. The initial MCTDH wavepacket is placed on the FC point of individual electronic state of respective molecule and its time-evolution is monitored.



Fig. S6: Initial electronic populatian decay profile of S_2 state of **P**. The initial MCTDH wavepacket is placed on the FC point of S_2 electronic state and its timeevolution is monitored. The S_2 state lifetime is calculated by fitting the initial electronic population (shown in black) to a simple monoexponential function.



Table S18: MCTDH details of normal mode combination, primitive basis and single particle basis used in the S_1 - S_6 dynamics and T_1 - T_4 / T_1 - T_5 dynamics of **P**, **AP2** and **AP4**.

$\mathbf{Singlets}$			
	Normal modes	Primitive basis	SPF basis
	$(\nu_3, \nu_{11}, \nu_{16}, \nu_{23}, \nu_{26})$	(7, 9, 7, 5, 4)	$[4,\!4,\!4,\!4,\!7,\!4]$
	$(\nu_1,\!\nu_9,\!\nu_{13},\!\nu_{19},\!\nu_{27})$	(10, 9, 6, 8, 4)	$[7,\!4,\!5,\!5,\!10,\!6]$
Р	$(\nu_4,\!\nu_7,\!\nu_{15},\!\nu_{24},\!\nu_{29})$	(5,7,7,7,6)	$[4,\!4,\!4,\!4,\!7,\!5]$
	$(\nu_2,\!\nu_8,\!\nu_{18},\!\nu_{21},\!\nu_{30})$	(6, 7, 8, 4, 7)	[6, 7, 4, 6, 4, 4]
	$(\nu_6, \nu_{12}, \nu_{14}, \nu_{20}, \nu_{28})$	(7, 8, 6, 4, 4)	$[7,\!6,\!4,\!5,\!5,\!6]$
	$(\nu_5, \nu_{10}, \nu_{17}, \nu_{22}, \nu_{25})$	(6, 6, 6, 6, 5)	[4, 4, 6, 4, 4, 4]
	$(\nu_3, \nu_{10}, \nu_{14}, \nu_{21}, \nu_{28})$	(7, 7, 8, 7, 6)	[4,5,6,4,4,4]
	$(\nu_4, \nu_{11}, \nu_{16}, \nu_{23}, \nu_{27})$	(6,10,9,9,7)	[4,4,4,4,5,5]
	$(\nu_1, \nu_2, \nu_{26}, \nu_{22})$	(10, 9, 6, 8)	[8,9,10,9,8,7]
AP2	$(\nu_8, \nu_{12}, \nu_{17}, \nu_{30})$	(7,10,9,7)	[5,5,5,5,4,4]
	$(\nu_5, \nu_{15}, \nu_{19}, \nu_{20})$	(5,9,8,7)	[4,4,4,4,5,5]
	$(\nu_9, \nu_{13}, \nu_{18}, \nu_{24})$	(8,9,8,8)	[5,4,4,4,5,5]
	$(\nu_6, \nu_7, \nu_{25}, \nu_{29})$	(6, 6, 6, 7)	[4, 4, 4, 4, 5, 5]
	$(\nu_3, \nu_{11}, \nu_{16}, \nu_{23}, \nu_{26})$	(6.9.6.7.5)	[4.5.5.5.5.5]
	$(\nu_1, \nu_9, \nu_{13}, \nu_{19}, \nu_{27})$	(10.6, 4.8, 9)	[7,8,10,10,10,9]
AP4	$(\nu_4, \nu_7, \nu_{15}, \nu_{24}, \nu_{29})$	(5.6.7.6.5)	[5.6.6.6.6.5]
	$(\nu_2,\nu_8,\nu_{18},\nu_{21},\nu_{30})$	(7, 6, 6, 5, 5)	[7,4,7,4,4,4]
	$(\nu_6, \nu_{12}, \nu_{14}, \nu_{20}, \nu_{28})$	(4,5,7,9,9)	[4,4,4,4,4,4]
	$(\nu_5, \nu_{10}, \nu_{17}, \nu_{22}, \nu_{25})$	(5,9,6,5,5)	[5,4,4,4,4,4]
Triplets			
	$(\nu_1, \nu_{11}, \nu_{14}, \nu_{21}, \nu_{30})$	(9,4,4,7,8)	[8,4,4,7]
	$(\nu_2, \nu_8, \nu_{16}, \nu_{23}, \nu_{28})$	(6, 5, 5, 6, 5)	[4,5,6,6]
Р	$(\nu_3, \nu_7, \nu_9, \nu_{22}, \nu_{25})$	(5,7,10,5,5)	$[9,\!6,\!9,\!7]$
	$(\nu_4, \nu_{12}, \nu_{13}, \nu_{17}, \nu_{27})$	(7, 4, 4, 4, 4)	[5,4,6,4]
	$(\nu_6, \nu_{15}, \nu_{19}, \nu_{20}, \nu_{26})$	(5,4,5,5,5)	[4,4,5,4]
	$(\nu_5, \nu_{10}, \nu_{18}, \nu_{24}, \nu_{29})$	(8,4,7,7,4)	[8,6,4,6]
	$(\nu_3, \nu_8, \nu_{14}, \nu_{21}, \nu_{28})$	(4, 5, 10, 5, 4)	[4, 4, 4, 5]
	$(\nu_4, \nu_{11}, \nu_{16}, \nu_{23}, \nu_{27})$	$(5,\!8,\!8,\!6,\!5)$	[7, 5, 6, 6]
	$(\nu_1,\!\nu_7,\!\nu_{10},\!\nu_{26},\!\nu_{22})$	$(10,\!4,\!6,\!6,\!7)$	[8, 9, 10, 10]
AP2	$(\nu_2, \nu_6, \nu_{12}, \nu_{17}, \nu_{30})$	$(9,\!6,\!7,\!9,\!7)$	[7, 7, 8, 8]
	$(\nu_5, \nu_{15}, \nu_{19}, \nu_{20}, \nu_{25})$	(6, 9, 9, 6, 5)	[6, 4, 4, 4]
	$(\nu_9, \nu_{13}, \nu_{18}, \nu_{24}, \nu_{29})$	(5,10,8,6,6)	[4,4,5,4]
	$(\nu_3, \nu_{11}, \nu_{16}, \nu_{23}, \nu_{26})$	(5, 8, 4, 5, 4)	[5, 4, 4, 4, 4,]
	$(\nu_1, \nu_9, \nu_{13}, \nu_{19}, \nu_{27})$	(10, 9, 6, 8, 7)	[8, 9, 9, 9, 10]
	$(\nu_4, \nu_7, \nu_{15}, \nu_{24}, \nu_{29})$	$(5,\!6,\!6,\!9,\!4)$	[4, 5, 6, 6, 7]
AP4	$(\nu_2, \nu_8, \nu_{18}, \nu_{21}, \nu_{30})$	(5,7,8,7,5)	[4, 4, 5, 4, 4]
	$(\nu_6, \nu_{12}, \nu_{14}, \nu_{20}, \nu_{28})$	(7, 4, 7, 7, 4)	[7, 4, 4, 4, 4]
	$(\nu_5, \nu_{10}, \nu_{17}, \nu_{22}, \nu_{25})$	(7, 7, 8, 6, 9)	[7, 6, 5, 5, 5]