

Supplementary Videos

I. SMALLER HYDROGEN CHAINS

Both FCI and eigenvector continuation trajectories are plotted side by side, including their comparison for energies, populations and atomic distances. The trajectory for the 4-atom hydrogen chain is given under `H4/traj_H4_S1.mp4` and for the 8-atom hydrogen chain under `H8/traj_H8_S3_sym.mp4`. The training wavefunctions used for eigenvector continuation and details of the electronic and FSSH calculations are given in the main text.

II. 28-ATOM HYDROGEN CHAIN DYNAMICS

Some exemplary trajectories for the different configurations of the nonadiabatic 28-atom hydrogen chain dynamics are given in the H28 folder. `H28/traj_idealdimer.gif` shows one the trajectories that was identified to form ideal H_2 dimers, whereas a trimer formation is demonstrated in `H28/traj_trimer567.gif` between the 5th, 6th and 7th hydrogen atoms. Finally, a rare free hydrogen case is shown in `H28/traj_free12.gif` where $\text{H}_{10}\text{-H}_{11}$ and $\text{H}_{13}\text{-H}_{14}$ form dimers leaving the 12th hydrogen free.