

Supplementary Information

Material-Agnostic Characterization of Spatially Offset Raman Spectroscopy in Turbid Media via Monte Carlo Simulations

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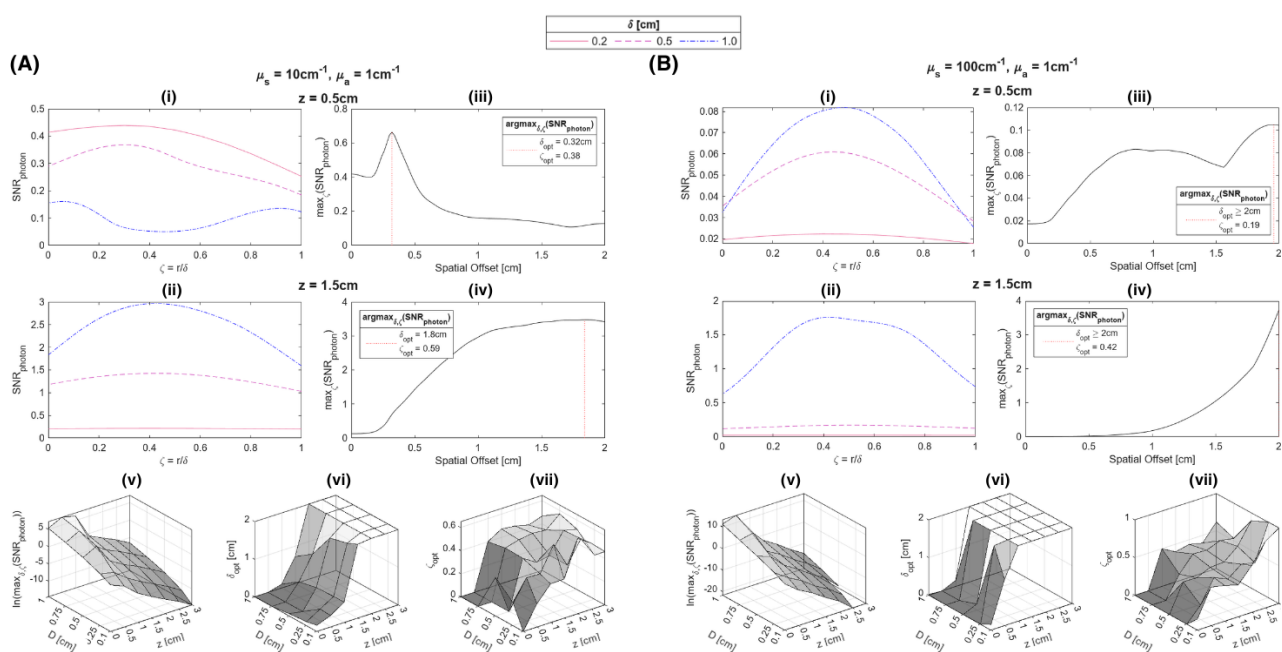


Figure S1. Maximum attainable SNR_{photon} values and corresponding δ_{opt} and ζ_{opt} values follow similar dependencies on D and z in different materials. Representative SNR_{photon} versus ζ_{opt} plots at $z = 0.5$ cm (i) and 1.5 cm (ii) and $\delta = 0.2, 0.5, 1.0$ cm, $\max_{\zeta}(SNR_{photon})$ versus δ plots at $z = 0.5$ cm (iii) and 1.5 cm (iv), $\max_{\delta, \zeta}(SNR_{photon})$ versus (D, z) log-scale plots (v), δ_{opt} versus (D, z) plots (vi), and ζ_{opt} versus (D, z) plots (vii) for $\mu_s = 10$ cm⁻¹, $\mu_a = 1$ cm⁻¹ (A) and $\mu_s = 100$ cm⁻¹, $\mu_a = 1$ cm⁻¹ (B).

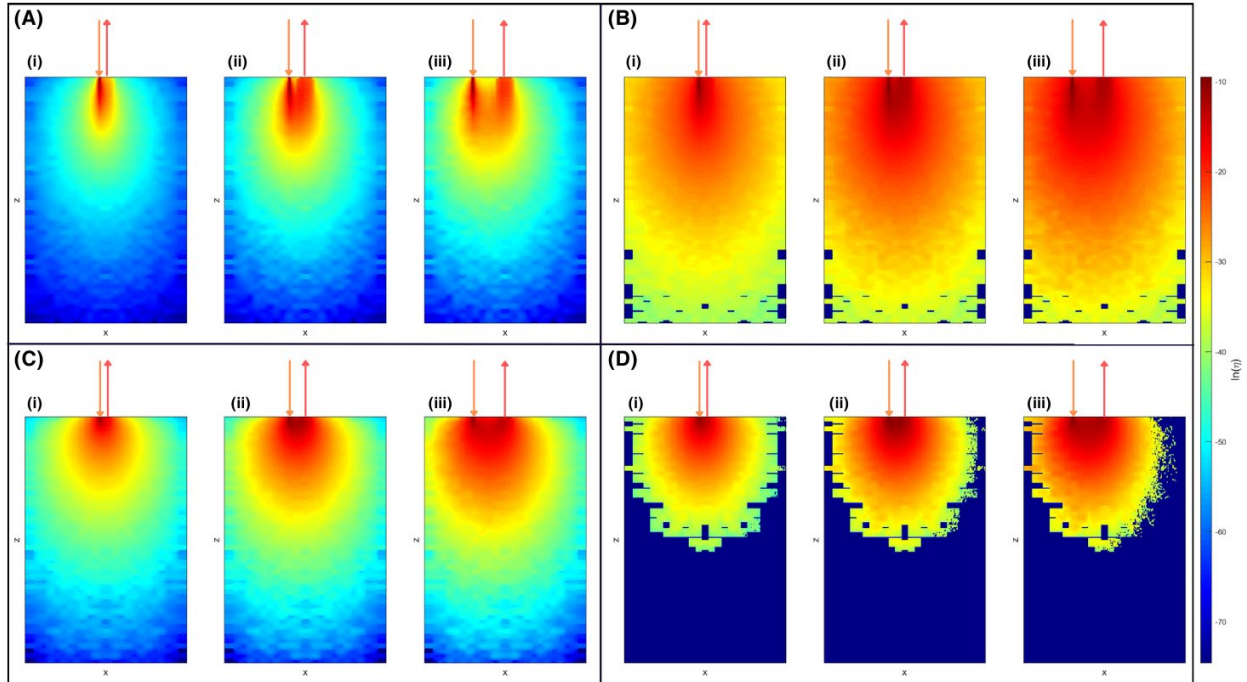


Figure S2. Visual representation of collected Raman intensity, η , in log-scale, along a two-dimensional slice coplanar to the excitation (orange arrow) and collection (red arrow) probes, at $\delta = 0.2$ cm (i), $\delta = 0.5$ cm (ii) and $\delta = 1.0$ cm (iii), for $\mu_s = 10$ cm⁻¹ & $\mu_a = 0.1$ cm⁻¹ (A), $\mu_s = 10$ cm⁻¹ & $\mu_a = 1.0$ cm⁻¹ (B), $\mu_s = 100$ cm⁻¹ & $\mu_a = 0.1$ cm⁻¹ (C), and $\mu_s = 100$ cm⁻¹ & $\mu_a = 1.0$ cm⁻¹ (D).

Figure S2 shows that large values of η follow a curved subsurface path, with hotspots close to either the laser or detector. In some cases, η is clearly greater at the laser than at the detector (Figure 2A-C.ii-iii). The raw data and Monte Carlo code used to obtain the various η distributions in this study are available on Github: <https://github.com/zurieljoen/SORS-Simulations/>