

Abstract Submitted
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Resonances in ultracold reactive collisions of vibrationally excited ortho and para H₂ with D¹ I. SIMBOTIN, R. CÔTÉ, Department of Physics, University of Connecticut — Recent experimental work on collisions of molecular hydrogen with metastable helium showed pronounced shape resonances in the sub-kelvin regime, which have a dramatic effect on the energy dependence of cross sections. In our computational work we will address the question of whether such near threshold resonances exist for the benchmark system H₂ + D. Detailed computations will be performed for an energy range extending from ultracold to about $E = 20$ kelvin (to include the temperature regime of astrophysical interest, e.g., relevant to cold molecular clouds). We will explore several initial vibrational states of H₂ in order to see how the internal vibrational excitation will influence the presence of shape resonances. We will also investigate the effect of the nuclear spin symmetry of H₂ by computing scattering rates for both ortho and para hydrogen, which could give significantly different results at low energies.

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