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Potential energy surfaces for inelastic collisions

Inelastic scattering of molecular species by hydrogen molecules is an important process in a variety of astrophysical environments. These collisions have been studied for many decades using numerous theoretical methods and dynamical approximations. A detailed and accurate knowledge of the potential energy surfaces (PESs) is, however, the key ingredient in these calculations. We will review recent advances in contructing and monitoring multi-dimensional PESs for van der Waals systems of astrophysical interest (e.g. H2O-H2, NH3-H2). We will focus in particular on the cold regime (T<100K) where quantum effects due to potential wells are important.