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Scattering properties of three ultracold atoms in a cylindrical waveguide geometry[1] DOERTE BLUME, ITAMP and Washington State University, JANINE SHERTZER, ITAMP and College of the Holy Cross — In the ultracold regime the de Broglie wavelength is much larger than the van der Waals length, and the true atom-atom potential can be replaced by a simple model potential. Using a short-range Gaussian interaction model, the scattering properties of three atoms in a cylindrical waveguide geometry are analyzed using two independent and complementary approaches: the finite element method and an explicitly correlated Gaussian basis set. We integrate over the coordinates associated with the tight confinement direction and calculate the effective potential curves as a function of the hyperradius, which is defined in terms of the particle coordinates parallel to the axis of the waveguide. The scattering properties are determined by solving the coupled set of hyperradial equations.

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