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Numerical studies of three-body recombination in systems with many bound states[1] JIA WANG, JOSE D'INCAO, CHRIS GREENE, Department of Physics and JILA, University of Colorado, Boulder, Colorado 80309-0440, USA — We have performed numerical studies of three-body recombination processes for a system of three identical bosons. Our two-body model potentials are designed to support many bound states, which produce a complex set of sharp nonadiabatic avoided crossings in the three-body hyperradial adiabatic potentials at short distance. Our model thus mimics the usual difficulties of realistic systems. To overcome these numerical challenges associated with sharp avoided crossings, we use the "slow variable discretization (SVD)" approach in the region of small hyperradii. At larger hyperradii, where the adiabatic potentials and couplings are smooth, we use the traditional adiabatic method. Then, using the R-matrix propagation method, we solve the three-body schödinger equation out to large radii and calculate the three-body recombination rate. We also explore universal aspects of recombination for large scattering lengths under more realistic scenarios.

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