Abstract Submitted
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Three-body recombination of helium atoms from ultracold to thermal energies: classcial trajectory vs. quantal calculations[1] JESUS PEREZ-RIOS, Department of Physics, Purdue University, West Lafayette, IN 47907, USA, STEVE RAGOLE, Joint Quantum Institute, University of Maryland, College Park, MD 20742, USA, JIA WANG, Department of Physics, University of Connecticut, Storrs, CT 06269, USA, CHRIS H. GREENE, Department of Physics, Purdue University, West Lafayette, IN 47907, USA — Classical trajectory and quantum calculations of helium three-body recombination are compared. The energies treated range from the ultracold up to the thermal regime. Quantum calculations are performed for the $J^{\Pi} = 0^{+}$ symmetry of the three-body recombination rate in order to compare with the classical results for zero angular momentum, yielding a good agreement for $E \sim 1$ K. The classical calculations are treated as a scattering process in $n = 6$-dimensions, and the results emerge from trajectory calculations. The classical threshold law is derived and numerically confirmed for the three-body recombination rate. Finally, a relationship is found between the quantum and classical three-body elastic cross section for a hard hypersphere that resembles the well-known shadow scattering in two-body collisions.

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