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Giant molecules composed of polar molecules and atoms in mixed dimensions RAN QI, Joint Quantum Institute, University of Maryland, SHINA TAN, School of Physics, Georgia Institute of Technology — Two or three polar molecules, confined to one or two dimensions, can form stable bound states with a single atom living in three dimensions, if the molecule and the atom can interact resonantly such that their mixed dimensional scattering length is large. We call these bound states "giant molecules" since it's a molecule composed of smaller molecules and atoms. We study their properties using techniques including exact numerical solution, exact qunatum diffusion Monte Carlo (QMC), Born-Oppenheimer approximation (BOA), and semiclassical approximation. These bound states have a hierarchical structure reminiscent of the celestial systems.

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