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**Theoretical Dynamics of Heavy Rydberg States in Rb<sub>2</sub>** ADAM KIRRANDER, H.R. SADEGHPOUR, ITAMP, Harvard-Smithsonian CfA, Cambridge, MA 02138, USA — Rydberg states, characterized by long-range Coulomb interactions, are normally associated with states consisting of an electron and a positively charged atomic or molecular ion, but can also occur as vibrational states in ionic bonds between atoms. In such heavy Rydberg states, the light electron is replaced by a much heavier negative ion. Compared to normal vibrational states these have unusual properties, including extremely large internuclear distances, large dipole moments, and an infinity of states below the ion-pair dissociation limit. Ion-pair states are difficult to observe in experiments, but recently detailed spectra of heavy Rydberg states in H<sub>2</sub> and Cl<sub>2</sub> have been reported. We collaborate with the experimental groups of E. E. Eyler and P. Gould (UConn) to find heavy Rydberg states in Rb<sub>2</sub>. Recent theoretical results are presented, and we discuss the potential application of Rb<sub>2</sub> heavy Rydberg states in cold matter physics.

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