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Long Range, Cold Cs Rydberg Atom-Rydberg Atom Molecules K. RICHARD OVERSTREET, ARNE SCHWETTMANN, JONATHAN TALLANT, JAMES P. SHAFFER, University of Oklahoma — The interaction between atoms in a cold Rydberg gas depends strongly on electric field and principle quantum number. When the density of states becomes large enough at large n, avoided crossings between different molecular states occur frequently. The character of these crossings can be controlled with a background electric field. At some background electric fields, bound molecular Rydberg states appear. We present experimental work on detecting these bound Rydberg molecules in a cold Rydberg gas using the Coulomb repulsion of the Ryberg atoms after pulsed field ionization.

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