

Abstract Submitted  
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**Interactions of Rydberg atoms in a Bose-Einstein condensate<sup>1</sup>** JIA WANG, MARKO GACESA, ROBIN CÔTÉ, Department of Physics, University of Connecticut, Storrs, CT — Recent developments in ultracold Rydberg gases led to the prediction and discovery of ultra-long-range Rydberg molecules. A Rydberg atom can interact with a ground state atom and form a bound state, the so-called “trilobite state,” via an oscillatory Born-Oppenheimer potential arising from Rydberg electron-ground state atom low-energy scattering. Two Rydberg atoms can also be bound via a dispersion potential, and form a “macrodimer.” Here we consider two Rydberg atoms immersed in a dilute Bose-Einstein condensate (BEC). The interaction between the two Rydberg atoms is studied, and the formation of a possible ultra-long-range Rydberg molecule is shown.

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Jia Wang  
Department of Physics, University of Connecticut, Storrs, CT

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