

Abstract Submitted  
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**Progress with Ultracold Rydberg Atoms in Electric Fields**<sup>1</sup> J.E. JOHNSON, I. ARAKELYAN, TAO HONG, S.L. ROLSTON, Joint Quantum Institute, Dept. of Physics, University of Maryland and National Institute of Standards and Technology, College Park, MD 20742, USA — We present progress toward realizing a gas of ultracold Rydberg atoms with defined dipole-dipole interactions. A two-photon process excites a transition in a magneto-optical trap of cold  $^{87}\text{Rb}$ , during which we apply an electric field to orient the dipole moment of the atoms. We have observed Autler-Townes splitting and the Stark shift of the Rydberg excitation energy, and report progress toward exciting polarized Rydbergs in an optical trap and optical lattice. These techniques have applications to neutral atom quantum computing, as well as studying the Extended Bose-Hubbard Model.

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J. E. Johnson  
Joint Quantum Institute, Dept. of Physics, University of Maryland and  
National Institute of Standards and Technology, College Park, MD 20742, USA

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