Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Rydberg Blockade Effects on Autler-Townes Spectra in a Dense Gas of ^{84}Sr B.J. DESALVO, J.A. AMAN, F.B. DUNNING, T.C. KILLIAN, Rice Univ — We study two-photon spectroscopy of the $5s^2\ ^1S_0 - 5s5p^3P_1 - ns^3S_1$ transition for $n = 24$ in the Autler-Townes regime in an ultracold gas of ^{84}Sr. These studies are performed on thermal samples ($\sim 10^{12} cm^{-3}$) and on a Bose-Einstein condensate (BEC) ($\sim 5 \times 10^{13} cm^{-3}$). Both cases exhibit spectra that are significantly modified from the usual Autler-Townes picture. In the case of thermal atoms, we observe a broadening and shift of the two loss features consistent with Rydberg-Rydberg interactions. However in the case of a BEC, a third feature develops between the two peaks due to light scatter from the $5s^2\ ^1S_0 - 5s5p^3P_1$ transition for heavily blockaded atoms. Implications of these effects for the creation of Rydberg dressed BEC will be discussed. This research was supported by the AFOSR under grant no. FA9550-12-1-0267, the NSF under grants nos. 1301773 and 1205946, and the Robert A. Welch Foundation under grants nos. C-0734 and C-1844.

Brian DeSalvo
Rice Univ

Date submitted: 30 Jan 2015 Electronic form version 1.4