Abstract Submitted for the DAMOP15 Meeting of The American Physical Society

Rydberg-blockaded medium inside a high-finesse optical cavity JITENG SHENG, SANTOSH KUMAR, WILLIAM WHITENECK, JONATHON SEDLACEK, JAMES SHAFFER, University of Oklahoma — We present experimental and theoretical progress on a Rydberg-blockaded atomic ensemble coupled to a high-finesse optical cavity. Theoretically, we analyze the role that the Rydberg blockade mechanism can play in synthesizing collective quantum states and non-classical states of light in this system. We study the correlation of two photon emission in the case of two Rydberg excitations within the cavity. Experimentally, we show that a cold atomic cloud can be transported into a high-finesse optical cavity by using a focus-tunable lens and that a collective state can be created inside the cavity using Rydberg atom blockade. Future work to realize collective quantum states in the atom-cavity experiment and study the interesting dynamics of the correlated photon emission will be presented.

> Santosh Kumar University of Oklahoma

Date submitted: 28 Jan 2015

Electronic form version 1.4