Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Superradiant Supercooling GRAHAM GREVE, BAOCHEN WU, JILA/CU-Boulder, JAMES THOMPSON, CU-Boulder — We will describe recent progress learning to exploit collective effects of many laser-cooled atoms in a medium finesse optical cavity. We will first describe experimental work attempting to observe a newly predicted collective cooling mechanism in which rubidium atoms are cooled as they undergo lasing in a deep bad-cavity or superradiant regime. It is predicted that the cooling rate is collectively enhanced by the number of atoms, and the ultimate temperature limits can be well below the limit for standard cavity cooling. We will describe a novel trapping geometry for allowing the atoms to undergo guided falling in the cavity mode, and if time permits, we will discuss the generation of 10 dB of spatially-homogeneous spin-squeezing for future work on entanglement-enhanced atom interferometry.

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Date submitted: 30 Jan 2017 Electronic form version 1.4