Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Generation of Planar squeezing in a cold atomic ensemble GIORGIO COLANGELO, NAEIMEH BEHBOOD, FERRAN MARTIN CIURANA, GRACIANA PUENTES, ROBERT J. SEWELL, MORGAN W. MITCHELL, ICFO, QUANTUM OPTICS GROUP TEAM — We report on an experiment designed to squeeze simultaneously two components of the collective atomic spin of an atomic ensemble via stroboscopic quantum non-demolition (QND) measurements [G. Puentes, G. Colangelo, R. J. Sewell, M. W. Mitchell, New J, Physics 15 103031 (2013)]. We work with an ensemble of one million 87 Rb atoms, cooled in the F = 1 ground state and held in a weakly focused single beam optical dipole trap. We probe the atoms with us pulses of linearly polarised off-resonant light on the D2 line, detected by a shot-noise limited polarimeter. To produce a PQS, we apply a magnetic field By to coherently rotate an initially Fx polarized coherent spin state in the x; z plane, and semi-continously probe the spins. This allows us to successively measure and squeeze the Fz and Fx components of the atomic spin, while maintaining a large spin polarization in the Fx - Fz plane.

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Date submitted: 31 Jan 2014 Electronic form version 1.4