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**Relative number squeezing in a spin-1 Bose-Einstein condensate**

EVA BOOKJANS, CHRIS D. HAMLEY, MICHAEL S. CHAPMAN, Georgia Institute of Technology — The quantum properties of matter waves, in particular quantum correlations and entanglement are an important frontier in atom optics with applications in quantum metrology and quantum information. We will report on the observation of sub-Poissonian fluctuations in the magnetization of a spinor  $^{87}\text{Rb}$  condensate. The fluctuations in the magnetization are reduced up to 10 dB below the classical shot noise limit. This relative number squeezing is indicative of the predicted pair-correlations in a spinor condensate and lay the foundation for future experiments involving spin-squeezing and entanglement measurements. We have investigated the limits of the imaging techniques used in our lab, absorption and fluorescence imaging, and have developed the capability to measure atoms numbers with an uncertainty  $< 10$  atoms. Condensates as small as  $\approx 10$  atoms were imaged and the measured fluctuations agree well with the theoretical predictions.

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