

Abstract Submitted
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Non-destructive imaging of spinor Bose-Einstein condensates¹ E. CARLO SAMSON, ANSHUMAN VINIT, CHANDRA RAMAN, Georgia Institute of Technology — We present a non-destructive differential imaging technique that enables the observation of the spatial distribution of the magnetization in a spinor Bose-Einstein condensate (BEC) through a Faraday rotation protocol. In our procedure, we utilize a linearly polarized, far-detuned laser beam as our imaging probe, and upon interaction with the condensate, the beam's polarization direction undergoes Faraday rotation. A differential measurement of the orthogonal polarization components of the rotated beam provides a spatial map of the net magnetization density within the BEC. The non-destructive aspect of this method allows for continuous imaging of the condensate. This imaging technique will prove useful in experimental BEC studies, such as spatially resolved magnetometry using ultracold atoms, and non-destructive imaging of non-equilibrium behavior of antiferromagnetic spinor condensates.

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