Abstract Submitted
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Detection and Imaging of He_2 Triplet Molecules in Superfluid Helium[1] W.G. RELLERGERT, S.B. CAHN, A. CURIONI, J.A. NIKKEL, J.D. WRIGHT, D.N. MCKINSEY, Yale University — We present new results on the detection and imaging of He_2 triplet molecules in superfluid helium using laser-induced fluorescence. A two photon transition at 905 nm results in the emission of a single detectable photon of shorter wavelength (640 nm). This cycling transition can be driven many times over the course of the molecule lifetime (13 s). New lasers with higher repetition rates and average powers have allowed us to study the efficiency of the transition as the cycling rate is increased. Results of these studies and their implications for detecting and imaging individual molecules are discussed. This technique has potential applications in the detection of gamma rays, WIMP dark matter, and ultracold neutrons, as well as the three-dimensional imaging of fluid flow and vortices in superfluid helium.

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