

Abstract Submitted
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Bose-Einstein condensation in solid helium RICHARD AZUAH, NIST Center for Neutron Research, Gaithersburg, SOULEYMANE DIALLO, Ames Laboratory, Ohio, OLEG KIRICHEK, ISIS Spallation Neutron Source, Didcot, UK, JON TAYLOR, ISIS Spallation Neutron Source, Didcot, UK, HENRY GLYDE, University of Delaware — We report new measurements of the Bose-Einstein condensate fraction in solid helium. The goal is to reveal whether there is BEC associated with the superfluid fractions that have been observed in solid helium [1,2]. The condensate fraction, n_0 , is obtained from neutron scattering measurements of the momentum distribution, $n(k)$, of the atoms in the solid. We use commercial grade helium (^3He concentration of 0.3 %) where the T_c for superflow is $T_c = 200$ mK and have measured the $n(k)$ at 3 temperatures, 500 mK, 150 mK and 65 mK. We use a sample cell that has a large surface to volume ratio ($S/V = 40 \text{ cm}^{-1}$) where large superfluid fractions have recently been reported[2]. We use a large sample volume (100 cm^3) and high instrument resolution to improve precision beyond that of previous measurements [3]. No clear sign of BEC has been observed but the data is being analyzed so that specific values of n_0 can be reported. [1] E. Kim and M.H.W. Chan. *Science*, 305:1941 (2004); *Nature*, 427:225, 2004. [2]A. S. C. Rittner, and J. D. Reppy, *Phys. Rev. Lett.*, 98:175302, 2007. [3] Diallo et al. *Phys. Rev Lett.* 98, 205301 (2007).

Henry Glyde
University of Delaware

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