

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Liquid helium in disorder and boson localization FRANCESCO ALBERGAMO, Institut Laue-Langevin, France, JONATHAN PEARCE, Institut Laue-Langevin, France, HENRY GLYDE, University of Delaware, DAVID DAUGHTON, University of Delaware, NORBERT MULDER, University of Delaware, JACQUES BOSSY, Centre de Recherche sur les Très Basses Températures, France, HELMUT SCHOBER, Institut Laue-Langevin, France — Neutron scattering measurements of the excitations of liquid ^4He confined in three porous media focusing on temperatures around the superfluid-normal fluid critical temperature T_c are presented and discussed. The three porous media are Vycor ($T_c = 2.05$ K at SVP), 44 Å pore diameter gelsil ($T_c = 1.92$ K at SVP) and 25 Å pore diameter gelsil ($T_c \approx 1.0$ K at SVP) ^[1,2]. In all these media, liquid ^4He supports well-defined phonon-roton excitations above T_c , in the "normal" phase (up $T_\lambda = 2.17$ K at SVP). Since well-defined excitations are associated with Bose-Einstein condensation (BEC), this suggests that there is BEC in the "normal" phase. Also, since there is no superflow, this BEC is apparently localized in the media separated by regions of normal fluid. In this picture, the superfluid-normal transition in disorder is associated with an extended-localized BEC crossover with localized BEC remaining above T_c ^[3].

^[1]F. Albergamo et al., Phys. Rev. B 69, 014514 (2004)

^[2]J. V. Pearce et al., Phys. Rev. Lett. 93, 145303 (2004)

^[3]H. R. Glyde et al., Phys. Rev. Lett. 84, 2646 (2000)

Henry Glyde
University of Delaware

Date submitted: 01 Dec 2004

Electronic form version 1.4