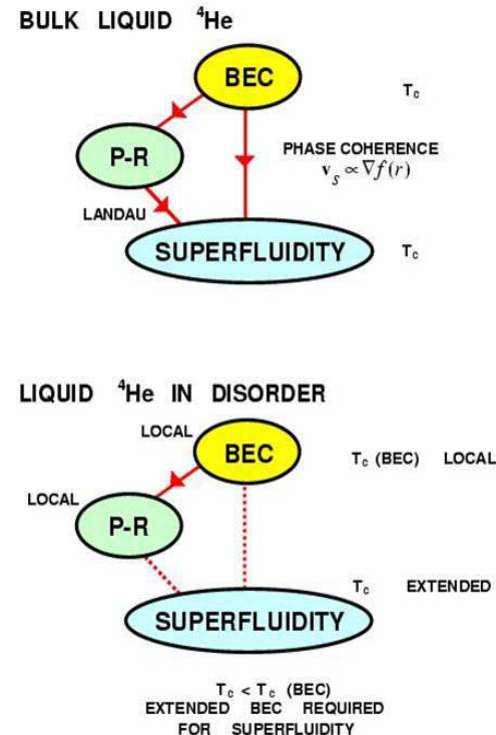


Localization of Bose-Einstein Condensation by Disorder

Henry Glyde, University of Delaware,
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John Larese, University of Tennessee

Focused Research Group, DMR-0115663

Our neutron scattering studies of liquid ^4He in porous media show evidence of Bose-Einstein Condensation localized by disorder. In bulk, pure systems the origin of superfluidity (and superconductivity) is BEC. Once there is BEC, there are simultaneously phonon-roton excitations and superfluidity. In contrast, in disorder the BEC can be localized so that there are P-R excitations but no macroscopic superfluidity. Superfluidity follows at a lower temperature when the BEC becomes extended across the sample. The “localized BEC” state in liquid ^4He is similar to the “pseudo gap” state observed in high T_c superconductors.



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Education:

A clear goal of the Focused Research Group is to train students and post-doctoral associates at the world class facilities Institut Laue Langevin (France) and the ISIS Facility (UK) for a career in neutron scattering. The FRG currently includes four undergraduates and six graduate students. Richard Azuah, formerly a post-doc in the group, shown opposite working at ISIS, is now a staff member at the Cold Neutron Research Facility, NIST, Gaithersburg.

