Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

**Deep Inelastic Neutron Scattering Study of Nanoconfined Liquid Helium Mixtures**[1] PAUL SOKOL, TIMOTHY PRISK, NARAYAN DAS, Indiana University Department of Physics — The single-particle momentum distribution $n(p)$ plays a central role in the contemporary understanding of quantum many- body systems, especially the helium liquids. The superfluid behavior of liquid $He^4$ below the famous lambda-point temperature is associated with the Bose condensation of a macroscopic fraction of the $He^4$ atoms to the zero momentum state. This manifests itself in $n(p)$ as a $\delta$-function singularity at $p = 0$. Similarly, the Fermi liquid character of $He^3$ is associated with a sharp discontinuity in the Fermi surface at the Fermi momentum $p_F$. Using the Wide Angular Chopper Spectrometer at the Spallation Neutron Source, we recently carried out a deep inelastic neutrons scattering study of dilute $He^3$ + $He^4$ solutions confined in mesoporous MCM-41 in order to investigate the effects of confinement on the non-classical momentum distribution of an isotopic helium solution. The Bose condensate fraction, Fermi surface, average isotopic kinetic energies, and related work in the literature will be discussed.

[1]This work was supported by award 70NANB5H1163 from NIST, U.S. DOC. This research at ORNL's Spallation Neutron Source was sponsored by Scientific User Facilities Division, Office of Basic Science, U.S. DOE.

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Date submitted: 13 Nov 2010 Electronic form version 1.4