Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Polarized ^{3}He Gas for Neutron Scattering WANGCHUN CHEN, NIST and Indiana University, ROSS ERWIN, SHANNON WATSON, THOMAS GENTILE, NIST, CHANGBO FU, NIST and Indiana University — Nuclear spin polarized ^{3}He gas, produced by either metastability-exchange (MEOP) or spin-exchange optical pumping (SEOP), can be used to polarize or analyze neutron beams because of the strong spin dependence of the absorption cross section for neutrons by ^{3}He. Such neutron spin filters (NSFs) have applications in both neutron scattering and fundamental neutron physics. The advent of practical NSFs with ^{3}He polarization values exceeding 70% has led to substantial increase in these devices in the neutron scattering community worldwide. ^{3}He NSFs are advantageous over conventionally used neutron polarizers in that they can polarize a broad wavelength band of neutrons and polarize large area and widely divergent neutron beams. ^{3}He cells are often polarized off-line and transported to neutron instruments, hence long lifetime cells are critical. In addition NSFs are required to be compact and relatively insensitive to ^{3}He relaxation induced by external magnetic fields. In the talk I will present the current status of the polarized ^{3}He user program for neutron instruments at the NIST Center for Neutron Research. Topics include the production rate of highly polarized ^{3}He by SEOP, cell development, magnetostatic cavity development, and interfaces between ^{3}He spin filter devices and a variety of instruments.

Wangchun Chen
NIST and Indiana University

Date submitted: 22 Jan 2009 Electronic form version 1.4