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^{3}He neutron spin filters for polarized neutron scattering. WANGCHUN CHEN, JULIE BORCHERS, YING CHEN, KEVIN O'DONOVAN, ROSS ERWIN, JEFFREY LYNN, CHARLES MAJKRZAK, SARAH MCKENNEY, THOMAS GENTILE, NIST, Gaithersburg, Maryland — Polarized neutron scattering (PNS) is a powerful tool that probes the magnetic structures in a wide variety of magnetic materials. Polarized ^{3}He gas, produced by optical pumping, can be used to polarize or analyze neutron beams because of the strong spin dependence of the neutron absorption cross section for ^{3}He. Polarized ^{3}He neutron spin filters (NSF) have been of great interest in PNS community due to recent significant improvement of their performance. Here I will discuss successful applications using ^{3}He NSFs in polarized neutron reflectometry (PNR) and triple-axis spectrometry (TAS). In PNR, a ^{3}He NSF in conjunction with a position-sensitive detector allows for efficient polarization analysis of off-specular scattering over a broad range of reciprocal space. In TAS, a ^{3}He NSF in combination with a double focusing pyrolytic graphite monochromator provides greater versatility and higher intensity compared to a Heusler polarizer. Finally I will present the results from patterned magnetically-coupled thin films in PNR and our first "proof-of-principle" experiment in TAS, both of which were performed using ^{3}He NSF(s) at the NIST Center for Neutron Research.

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