Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Online SEOP polarization of Large Area Neutron Spin Filters
EARL BABCOCK, ZAHIR SALHI, ALEXANDER IOFFE, Juelich Centre for Neutron Science at the FRM2 — The Juelich Center for neutron Science has a program to use SEOP polarized 3He Neutron Spin Filters (3He NSF) on many neutron scattering instruments. The main applications are for polarization analysis of the scattered beam. As such, the devices must operate in close proximity to the neutron sample and sample environment which can include complicated cryostats, humidity and pressure cells, and high field magnets. Thus we have developed novel magnetic cavities to house the 3He NSF cells which allow for simultaneous optical pumping on the instruments. Further we continually develop and redevelop the laser sources which must be relatively narrow band and have long term (i.e. months) stability and robust operation. The first fully operational polarizer has been used continuously for over 2, 60-day reactor cycles at the FRM2. This device uses a 12.5 cm I.D. 3He cell, and has a 3He storage lifetime, including the cells lifetime, in excess of 200 hours with the cell about 60 cm from the sample position inside a 1.2 T electromagnet, and has achieved over 75% 3He polarisation when fully optimized. This talk will describe the magnetic cavities, and laser sources as well as provide a description of the completed 3He polarizer devices.

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Date submitted: 12 Jan 2015 Electronic form version 1.4