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Neutron Spin Manipulation Devices Based on High Temperature Superconducting Technology

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Polarized neutron beams have a range of applications from magnetic studies to enhancing resolution in elastic and inelastic scattering, all of which rely upon precise control of the neutron spin. In recent years we have developed a series of devices including a neutron flipper, a polarimeter, and magnetic Wollaston prisms using superconducting components. By bounding magnetic field regions between high T_c YBCO films we are able to exploit the Meissner effect to create very uniform regions of magnetic field generated by passing high currents through superconducting YBCO tape. These devices have now been used in a series of experiments including phonon focusing, spin echo modulated SANS (SEMSANS) and Larmor diffraction. We are currently developing an RF flipper for MIEZE type experiments and wide angle device for conventional quasi-elastic and inelastic spin-echo. In this poster we will present an overview of our current and new devices along with recent experiments.

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