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Neutron Beam Polarization with ^3He Polarizing and Modulating Cells ROBERT COOPER, TIMOTHY CHUPP, University of Michigan, THOMAS GENTILE, NIST, Gaithersburg, FRED WIETFELDT, Tulane University — Precision experiments with polarized neutrons provide data on beta-decay correlation coefficients and particle physics of neutron decay. They rely upon large numbers of decays to achieve the desired level of statistical precision. High flux polychromatic neutron sources are used. This presents difficulties in characterizing the properly weighted polarization for all neutron wavelengths in the beam spectrum. Time of flight with a chopped beam typically characterizes the spectrum and wavelength dependent polarization. Our approach uses the well-known properties of a ^3He polarizer with an added thin ^3He cell to modulate the polarization. With the appropriate combination of thick and thin detectors, the beam polarization can be estimated with high precision. This real-time measurement properly weights the polarization by the decay probability (i.e. the capture-flux polarization), but does require precise knowledge of the thin ^3He cell properties. This alternative can provide a check on beam-chopping methods.

Robert Cooper
University of Michigan

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