

ACCELERATOR SEMINAR

“Thin Film Coatings and Guide Materials for Use in Ultra Cold Neutron Experiments”

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Ultracold neutrons (UCN), neutrons that have low enough kinetic energy that they may undergo total reflection from a given surface at any angle of incidence, provide an opportunity to study fundamental parameters of the neutron with very high precision. The UCNA experiment at the Los Alamos Neutron Science Center (LANSCE) employs polarized UCN to measure the neutron's beta asymmetry, which when combined with a measurement of the neutron's lifetime, can provide a measurement of the vector and axial vector weak coupling constants G_V and G_A . In this experiment the UCN are transported several meters from LANSCE's solid deuterium UCN source, through two polarizing magnets, and bottled in $2 \times 2\pi$ solenoid magnet and beta detector apparatus. The UCNA group at Virginia Tech is responsible for providing the beam line components that preserve the UCN flux and polarization, which are critical to achieve a precision measurement. Common guide materials include stainless steel, copper, nickel, aluminum, and quartz, however, several advantages can be obtained by applying a thin film of a “better” material onto guide components. Such films include nickel-58 and diamond-like-carbon (DLC). The methods used in the depositions as well as characterization of the thin films will be presented.

Tuesday, March 30, 2010

3:30 p.m. – 4:30 p.m.

CEBAF Center, Auditorium

Coffee before Seminar

Beginning at 3:00 p.m.