

## W0391

**Echoes from Nanostructured Films.** Roger Pynn, Physics Dept., Indiana Univ., Bloomington, IN47405.

In spite of the success of neutron reflectometry in providing many key insights into the layering of natural and man-made thin films, the technique has provided little information about the lateral structure of such films. Partly this is a result of the fact of their weak scattering. This is exacerbated by fact that structural motifs are often large compared to the neutron's wavelength so neutron beams have to be well collimated to obtain information about lateral structure by conventional diffraction techniques. In an attempt to overcome these limitations, a number of groups are pursuing a technique that uses Neutron Spin Echo to measure scattering angles for uncollimated beams. I will discuss the use of birefringent prisms to implement this method. The essence of the idea is to separate the two quantum spin states of a neutron in space using suitable magnetic prisms. The two quantum states interact with the scattering sample at different points in space and are then recombined by further prisms. The interference between the two quantum states is used to determine the correlation between the scattering potentials at the two scattering points. Conceptually, understanding the apparatus used for these studies is almost identical to understanding why a ray of light passes through a glass slab with a lateral displacement of its trajectory.