

Assignment for Polarized neutron reflectivity

1. Calculate the kinetic energy (in eV) and evaluate different potentials (in neV) for neutron of wavelength $\sim 2.5 \text{ \AA}$. (Given: magnetic moment of Ni = 0.6 Bohr magneton and coherent scattering length for Ni = 10.3 fm and assume no absorption part) (4)
 - (a) Nuclear potential in Ni medium
 - (b) Magnetic potential in Ni medium
 - (c) Gravitational potential for a height difference of 1 meter.
2. Derive the relation of the refractive index and critical angle of incidence with the nuclear scattering length density in a medium for neutron of wavelength λ . (3)
3. Calculate Critical angle of incidence (in degree) for two spins of neutron in Fe medium (Given: magnetic moment of Fe= 2.2 Bohr magneton and coherent scattering length for Fe = 9.7 fm and assume no absorption part) (3)