

Fabrication of Dy/Y superlattices for studies of spin wave quantization, J. Yu, H. Sato, H. Lee, J. Lee Robertson\*, R. Fishman\*, P. LeClair, and G.J. Mankey  
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Inelastic neutron scattering (INS) is the world's most powerful tool to study the magnetic excitations of solids. However, it was rarely applied in research because of the insufficient neutron flux and analyzer sensitivity, which lead to prohibitively long acquisition times on equipment that is very expensive to operate, and a lack of longer wavelength neutrons to more effectively probe the larger magnetic unit cell. Recent upgrades at the High Flux Isotope Reactor (HFIR) neutron scattering facility have led to dramatic improvements in usable neutron flux coupled with lower background signals. A set of Dy/Y superlattices, containing 2mg magnetic rare earth, were grown in MINT center, 2009. The preliminary INS experiment was performed and spin wave quantization was seen in the dispersion relation. In order to further increase the signal/noise ratio, more Dy/Y superlattices, containing 47mg magnetic rare earth, were fabricated in the summer of 2010, and their quality was evaluated by X-ray technique.