Magnetic coupling through iridium spacer layers

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Magnetic coupling between ferromagnetic layers through nonmagnetic spacer layers is studied with focus on the effects of biquadratic exchange. Previous neutron scattering studies of antiferromagnetically-coupled ferromagnetic layers in a superlattice structure with no biquradtic exchange showed when the ferromagnetic material is placed in a low field the ferromagnetic layers align in domains with moments perpendicular to the field and as a result no remnant magnetic moment is observed in the absence of applied magnetic field. Any observed remnant moment is attributed to a biquadratic exchange energy proportional to $\cos^2\theta$ where $\theta$ is the angle between the moments adjacent layers. There is a significant role played by the surface roughness which sometimes increases with the number of superlattice repeats. For this project, the magnetic properties of samples with a variable number of repeats are compared to gauge the relative strength of bilinear (antiferromagnetic) and biquadratic ($90^o$ coupling).