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Structural and Magnetic Ordering of the Interface of Fe/Gd Multilayers ATAUR CHOWDHURY, University of Alaska Fairbanks, ANDREA FREITAG, Brookhaven National Laboratories — Multilayers of Fe/Gd were fabricated with magnetron sputtering to study the magnetic and structural ordering of the interfaces of these multilayers. Two groups of samples, one with fixed Gd layer thickness and one with fixed Fe layer thickness, were prepared to study the effect of layer thickness on the structural properties of these multilayers. The samples were investigated using x-ray diffraction and Mossbauer spectroscopy. Two major structures were identified with x-ray diffraction, and two more minor structures were identified from Mossbauer measurement. The composition and the thickness of the interface was found to change with both Fe and Gd layer thicknesses. Results of Mossbauer measurement also show that an amorphous Gd-Fe component at the interface with an average composition close to that of the intermetallic compound GdFe_2 is likely to be the origin of perpendicular magnetic anisotropy (PMA) of Fe/Gd multilayers. Experimental results clearly suggest that PMA in Fe/Gd multilayers and amorphous Gd-Fe films may have the same origin.

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