



# INSTITUTE SEMINAR

Thursday, 28 November 2013

4.00 pm

Fermion

Speaker:

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Title:

**Tuning interface anisotropy in Ta|CoFeB|MgO**

Abstract:

Materials exhibiting Perpendicular Magnetic Anisotropy (PMA) are important for applications in spintronics based devices. In order to obtain very thin film with PMA it is relevant to utilize the interface magnetic anisotropy, which plays an important role in thin film heterostructures. Interface PMA which originates from the symmetry breaking at the interface, allows the system to maintain its magnetic anisotropy down to small thicknesses, whereas the bulk anisotropy, including crystalline and magneto-elastic anisotropies, are lowered with reduction in thickness. Recently developed Ta|CoFeB|MgO heterostructure [1] which show PMA has drawn significant attention due to its possible integration in magnetic tunnel junction and domain wall motion based devices. It is assumed that the PMA in this system originates from CoFeB|MgO interface. The role of Ta|CoFeB interface in achieving PMA has been also highlighted in a few studies [2]. In general, Ta is known for creating a magnetic dead layer when placed next to a magnetic layer. As the CoFeB layer thickness is of the order of 1 nm to obtain PMA, thus it is desirable to have negligible magnetic dead layer from the point of view of thermal stability. In this talk I shall discuss the effect of Ta and N doped Ta underlayer (TaN) on the interface PMA and magnetic dead layer in Ta(N)|CoFeB|MgO heterostructure [3].

[1] S. Ikeda *et al*, Nat. Mater. **9**, 721 (2010).

[2] D. C. Worledge *et al*, Appl. Phys. Lett. **98**, 022501 (2011).

[3] Jaivardhan Sinha *et al*, Appl. Phys. Lett. **102**, 242505 (2013).

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