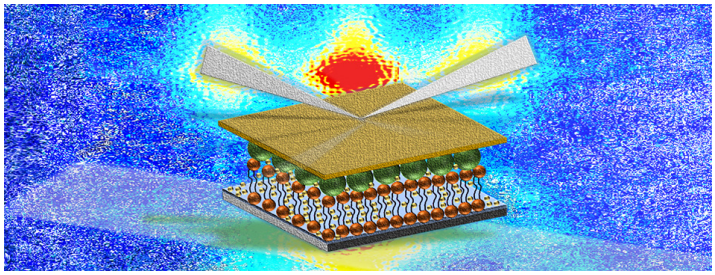

Beitrag ID: **47** Typ: **Talk**

Investigation of the structural and magnetic properties of the interface in Fe3O4/TiO2-Nb:STO heterostructures

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The Fe_3O_4/Nb:STO system has gathered significant attention due to its potential application in spintronics and memristors. The interface between Fe_3O_4 and Nb:STO plays a crucial role in determining the overall electronic and magnetic properties of the system. We present an investigation of a 30 nm Fe_3O_4 thin film on a TiO_2 terminated Nb-doped $SrTiO_3$ (TiO_2-Nb:STO) substrate deposited by pulsed laser deposition (PLD), focusing on the buried interface using Polarized Neutron Reflectometry (PNR), X-ray Magnetic Circular Dichroism (XMCD), and X-ray Reflectometry (XRR).

Our study utilizes XRR to assess the structural properties, including roughness and density variations, across the interface. PNR is employed to probe the magnetic depth profile. The combination of these techniques reveals a 1 unit cell (u.c.) γ-Fe_2O_3 interlayer between the Fe_3O_4 thin film and the Nb:STO substrate and a 2 u.c. γ-Fe_2O_3 surface layer. XMCD provides element-specific magnetic information throughout the entire system, confirming the total thickness of γ-Fe_2O_3 to be 3 u.c.

The results reveal significant modifications in the magnetic and structural properties at the buried interface, driven by interactions between the Fe_3O_4 film and the TiO_2-Nb:STO substrate. Specifically, the presence of the γ-Fe_2O_3 interlayer and surface layer affects the magnetic coupling of the system.

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