Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Webinar

Magnetism control of Metal Phthalocyanine molecules on magnetic substrate

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The use of organic molecules as building blocks in nano-spin electronics has triggered research in the area of molecular spintronics. This interest has arisen because organic molecules have certain advantages over other materials such as self-assembly, optical activity and easy chemical tunability (by changing central atom in metal-organic complexes or by modifying ligand chemistry). Molecules when adsorbed on transition metal surfaces give rise to novel interface magnetism offering many exciting surprises, driving the field of interface-assisted molecular spintronics[1-2]. In this thesis, using the concepts of "spinterface", I show the possibility to experimentally tune the surface anisotropy and surface exchange coupling at these interfaces using metal-phthalocyanine (MPc) molecules. We observe surface magnetic hardening in ultra-thin Fe films unified with 4-5 monolayer of MPc accompanied by a robust exchange bias response at lower temperatures. This study provides a new approach to characterize the anisotropy properties at spin-interfaces.

References:

1. K. V. Raman et al., Applied Physics Reviews, 1 (3), 031101, 2014.
2. K. V. Raman et al., Spin, 4 (2), 1440014, 2014.

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