

THURSDAY

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## The Spin-Dependent Surface Chemical Bond

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Organic materials are exciting material for spin-based electronics because their magnetic properties are extraordinarily tunable by synthetic chemistry [1]. Since about 2004, several device groups have observed spin dependent transport phenomena in organic materials [2] and suggested a decisive role for metal-organic interfaces in controlling spin injection [3]. We need to understand the magnetic properties of these interfaces to advance the fledgling field of organic spintronics.

I'll describe scanning tunneling microscopy and spectroscopy studies of model interfaces designed to probe the most important electronic interactions between magnetic substrates and organic molecules. First, I'll describe a unique case of indirect interactions between an organic semiconductor (PTCDA) and a d-derived surface state on Cr(001) that provides a (perhaps cautionary) illustration of the richness of interfacial interactions that can occur in these systems [4]. This indirect interaction will be contrasted with spin polarized STM studies of Alq<sub>3</sub> and related molecules that show hybrid interface states near the Fermi level when adsorbed on Cr(001).

[1] Sanvito, Chem. Soc. Rev. 40 3336 (2011).

[2] Dediu et al., 8, Nat. Mater. 8, 707 (2009).

[3] Barraud et al., Nat. Phys. 6, 615 (2010).

[4] Wang and Dougherty, Phys. Rev. B 92, 161401R (2015).