

## Cooperative Molecular Field Effect- A Source for New Electronic Properties at Interfaces

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New electronic and magnetic properties are induced by the adsorption of closed packed monolayers on solid substrates.[1] In layers made from chiral molecules, unexpectedly large electronic dichroism is observed, which manifests itself as spin specific electron transmission.[2] For many thiolated molecules self-assembled on gold, a surprisingly large paramagnetism is observed.[3] Self-assembled monolayers of double-stranded DNA oligomers on gold interact with polarized electrons similarly to a strong and oriented magnetic field. The direction of the field for right-handed DNA is away from the substrate. Moreover, the layer shows very high paramagnetic susceptibility. Interestingly, thiolated single-stranded DNA oligomers on gold do not show this effect.

All the observations can be rationalized by assuming orbital magnetism of the organic thin layer.[4] This is a new type of magnetism, induced by the formation of closed packed layer of organic molecules on metal. The adsorption results in charge transfer between the substrate and the adsorbed layer, which is the origin of this magnetism.

Key words:

Interfaces, monolayers, field-effect

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Topic: Surface Science