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**Doctoral Programme**

<http://solids4fun.tuwien.ac.at/>

## Guest Lecture

### Title:

“Engineering Coherent Interactions in Molecular Nanomagnet Dimers”

**Speaker:** Dr. Arzhang Ardavan

Address: The Clarendon Laboratory, Department of Physics, University of Oxford, UK

Date: Friday, 8<sup>th</sup> of April 2015

Time: 14:30

Place: Seminar Room CBEG02 (387, Photonics); Gußhausstraße 27

### Abstract:

Proposals for systems embodying condensed matter spin qubits cover a very wide range of length scales, from atomic defects in semiconductors all the way to micron-sized lithographically-defined structures. Intermediate scale molecular components exhibit advantages of both limits: like atomic defects, large numbers of identical components can be fabricated; as for lithographically-defined structures, each component can be tailored to optimize properties such as quantum coherence. We have demonstrated what is perhaps the most potent advantage of molecular spin qubits, the scalability of quantum information processing structures using bottom-up chemical self-assembly. Using Cr<sub>7</sub>Ni spin qubit building blocks, we have constructed several families of two-qubit molecular structures with a range of linking strategies. For each family, long coherence times are preserved, and we demonstrate control over the inter-qubit quantum interactions that can be used to mediate two-qubit quantum gates.