



TECHNISCHE  
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# IAP-SEMINAR

## EINLADUNG

Termin: **Dienstag, 24.9.2013 um 16:00 Uhr**  
Ort: **Technische Universität Wien,  
Institut für Angewandte Physik,  
Seminarraum 134A, Turm B (gelbe Leitfarbe), 5. OG  
1040 Wien, Wiedner Hauptstraße 8-10**

Vortragender: **Ing. Zbynek Novotny**  
TU Wien, IAP

Thema: **The Reconstructed Fe<sub>3</sub>O<sub>4</sub>(001) Surface as an Adsorption Template**

### Kurzfassung

Magnetite, Fe<sub>3</sub>O<sub>4</sub>, is a fascinating material for its electronic, magnetic, and catalytic properties. This presentation will deal with the (001) terminated surface. This surface forms a ( $\sqrt{2}\times\sqrt{2}$ )R45° reconstruction. Here, pairs of surface FeB and neighboring O ions are slightly displaced laterally, forming undulating rows with two inequivalent FeA bulk continuation sites. We term these narrow and wide sites, respectively.

The most common surface defects, adsorption of simple molecules, and various meta-stable Fe-rich terminations will be described. We will illustrate the pathway that lead us to the discovery of the unique adsorption property of this reconstructed ( $\sqrt{2}\times\sqrt{2}$ )R45° surface. We found that, at fractional monolayer coverage and at RT, this surface acts as a robust adsorption template for single atoms. This was tested with H, Fe, Au, Pd, Ag, Ni, Sr, and Co; all these elements adsorb as single adatoms at the narrow sites, forming ordered structures on the surface.

Selecting Au as an example, we will demonstrate the remarkable stability of these adatoms, both chemically in up to 10<sup>-4</sup> mbar of CO, and thermally up to 673 K. At higher annealing temperatures, different sizes of three dimensional Au clusters are observed.

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*Alle interessierten Kolleginnen und Kollegen sind zu diesem Seminar  
(45 min mit anschließender gemeinsamer Diskussion) herzlich eingeladen.*

*U. Diebold e.h.  
(Seminar-Chairperson)*

*H. Störi e.h.  
(LVA-Leiter)*