University of Birmingham

Dr Wolfgang Theis MInstP

Lecturer

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About

Dr Wolfgang Theis is a lecturer in the nano group. His research interests are surface science and its application to nanoscale structures and high-resolution electron microscopy.

Qualifications

- Habilitation in Experimental Physics, 2008
- PhD in Physics, Freie Universität Berlin, 1992
- Diplom in Physics, Freie Universität Berlin, 1989

Biography

Wolfgang Theis qualified with a Diplom in Physics at the Freie Universität Berlin in 1989.

He completed his PhD project at the Fritz-Haber Institut, Berlin studying surface melting of aluminium single crystals by valence band and core level photoemission using the BESSY synchrotron.

He was awarded an Otto-Hahn-Medal by the Max Planck Society for his Ph.D. thesis. The award included funding for a 12 month postdoctoral position at a lab of his choice, which he took up in the group of Dr Ruud Tromp at IBM, Watson Research Lab, York Town Heights, New York, USA. He studied surface and epitaxial growth dynamics by low energy electron microscopy (LEEM).

Returning to Berlin, Wolfgang worked in the group of Prof. Karl-Heinz Rieder until he was appointed as a lecturer in Birmingham in 2007.

Teaching

Teaching Programmes

- EPS Foundation Year Skills
- Year 1 Introduction to Nanophysics
- Year 2 tutor
- Year 4 project
- MPAGS NS2: Electronic Structure

Postgraduate supervision

Surface and Nano Science.

Research

Research Themes

- Surface Science at the Nanoscale
- Alloys including quasicrystals
- Electron microscopy
- Epitaxial growth

Research Activity

Instrumentation and processes are being developed to grow and anneal thin films, interfaces, and embedded clusters on nanoscale sized (10-100nm) apexes of specially prepared tungsten tips.

This is conducted in an ultra-high vacuum (UHV) scanning electron microscope (SEM) with the aim to provide superior samples for transmission electron microscopy (TEM) atomic scale tomography. Similar technology is being developed for thinning and post-processing of focused ion beam (FIB) lift-out pillars in UHV.

This effort is underpinned by ongoing fundamental research in epitaxy and ultrathin film growth dynamics by various surface science methods including low energy electron

microscopy (LEEM) and diffraction (LEED).

Other activities

Hon Secretary of the IOP Thin Films and Surfaces Group.

Publications

Rotenberg, Eli, Theis, W., Horn, K., Gille, P (2000), Quasicrystalline valence bands in decagonal AlNiCo, Nature 406: 602

Franke, K. J., Sharma, H. R., Theis, W., Gille, P., Ebert, Ph., Rieder, K. H. (2002), Quasicrystalline Epitaxial Single Element Monolayers on Icosahedral Al-Pd-Mn and Decagonal Al-Ni-Co Quasicrystal Surfaces, Phys. Rev. Lett. 89: 156104

Theis, W., Tromp, R. M. (1996), Nucleation in Si(001) homoepitaxial growth, Phys. Rev. Lett. 76: 2770

Yamada, Y., Rieder, K.-H., Theis, W. (2007), Surface phase transition in H/W(110) induced by tuning the Fermi surface nesting vector by Hydrogen loading, Phys. Rev. Lett. 99: 196105

Franke, K. J. , Gille, P. , Rieder, K.-H., Theis, W. (2007) Achieving epitaxy between incommensurate materials by quasicrystalline interlayers, Phys. Rev. Lett. 99: 036103

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