Ce surface alloys — •Markus Klein[1], Christina Albers[1], Juarez Da Silva[3], Kevin Beach[2], Fakher Assaad[2], and Friedrich Reinert[1] — [1]Universität Würzburg, Experimentelle Physik II, Am Hubland, 97074 Würzburg, Germany — [2]Universität Würzburg, Theoretische Physik I, Am Hubland, 97074 Würzburg, Germany — [3]National Renewable Energy Laboratory, 1617 Cole Blvd., Golden, CO 80401, USA

The physical properties of Kondo systems are determined by interactions between localized f-states and conduction electrons. Of particular interest are low-dimensional systems as they can serve as elementary model systems. Due to its surface sensitivity angle-resolved photoelectron spectroscopy (ARUPS) is an excellent tool to study directly the electronic structure of a two-dimensional Kondo system. This requires highly ordered and ultra thin singlecrystalline films. We have prepared singlecrystalline Ce surface-alloys by *in situ* deposition of Ce on noble metal surfaces. Our ARUPS results show a temperature and wave-vector dependent Kondo-resonance and other hybridization effects. We discuss our spectroscopic results with the help of data from isostructural La films, LDA+U, and DMFT calculations.

O 43.2 Tue 18:30 Poster F

Temperature Dependence of the Single Particle Spectral Function of the 2D Kondo Lattice Model using the Dynamical Cluster Approximation — •Lee Martin and Fakher Assaad — Universität Würzburg, Germany

We apply the dynamical cluster approximation, with a quantum Monte Carlo cluster solver using various cluster sizes, to the two-dimensional Kondo lattice model to investigate the evolution of the conduction electron single particle spectral function as a function of temperature. In the hole doped, paramagnetic metallic phase the problem contains two energy scales: the Kondo temperature, T_K, and the lower scale, the coherence temperature T_{coh}. With decreasing temperature, moving from the local moment to Kondo screened regime, we look for signatures of T_K in the spectral function before finally observing the formation of the coherent heavy fermion state at and below T_{coh}.

O 43.3 Tue 18:30 Poster F

Evidence for quantum confinement in lognormal size distributed nanodiamonds — •Thomas Berg[1], Edit Marosits[2], Jochen Maul[1], Peter Nagel[3], Ulrich Ott[2], Florian Schertz[1], Stefan Schuppler[3], Christa Sudek[2], and Gerd Schönhense[1] — [1]Institut für Physik, Staudingerweg 7, D-55128 Mainz, Germany — [2]Max-Planck-Institut für Chemie, Becherweg 27, D-55128 Mainz, Germany — [3]Forschungszentrum Karlsruhe, IFP, 76021 Karlsruhe, Germany

Quantum confinement (QC) in semiconductor nanoparticles was discovered more than two decades ago and received increasing interest during the recent years. In the case of nanodiamonds evidence for QC was reported by [1], but the discussion on the extend of these effects in nanosized diamonds is still ongoing [2,3,4].

We report on NEXAFS-PEEM measurements of the Carbon K-edge of meteoritic nanodiamonds. The NEXAFS spectrum of this nanodiamond population shows a broadened and asymmetric exciton which was assigned to the particles size distribution in recent publications but a detailed explanation is still missing. We present quantitative analysis of the modified peak shape in respect to energy shifts of the exciton and the onset of the carbon K-edge caused by the well known size distribution of this nanodiamond population as a consequence of QC. This project is supported by DFG (SCHO 341/10-1).

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O 43.4 Tue 18:30 Poster F

Setup and Characterization of a Standing-Wave PEEM for EUVL mask inspection — •Jochen maul[1], Jingquan Lin[2], Andreas Oelsner[1], Dima Valdaitsev[1], Nils Weber[3], Matthias Escher[3], Michael Merkel[3], Ulf Kleineberg[2], and Gerd Schoenhense[1] — [1]Institut fuer Physik, Staudinger Weg 7, Johannes Gutenberg-Universitaet, D-55128 Mainz — [2]Ludwig Maximilian-Universitaet, Am Coulombwall 1, 85748 Garching — [3]Focus GmbH, Neukirchner Str. 2, D-65510 Huenstetten-Kesselbach

Extreme ultraviolet lithography (EUVL) is one of the promising possibilities for driving the critical dimensions of semiconductor devices to the ultimate limit. One central issue for chip production using EUVL is the quality of reflective masks with patterned absorbers, employed for the structuring of semiconductor elements. Here, the density and the properties of defects are essential. For multilayer optics, two different types of defects are generally distinguished: amplitude defects and phase defects (or "buried defects") distorting the standing electrical wave inside the multilayer and leading to variations in the field strength at the surface. We show that standing-wave PEEM is a very powerful method as a spatially resolving detector for "at-wavelength (13.5 nm)" metrology. A setup has been designed that allows the study of masks with a size of six square inches. The present detection limit of our method for phase defects is 35 nm.

This work is supported by the European Union (6th Framework program) within the project "Exploring new limits to Moores law- More Moore".

O 43.5 Tue 18:30 Poster F

Optical magnetic circular dichroism in two-photon photoemission — •Kerstin Hild, Jochen Maul, Gerd Schoenhense, and Hans-Joachim Elmers — Institut fuer Physik, Staudinger Weg 7, Johannes Gutenberg-Universitaet, D-55128 Mainz

Magnetic circular dichroism in two-photon photoemission (2PPE) was demonstrated based on frequency-doubled femtosecond laserlight (pulse length ˜150fs). Thin films of Ni2MnGa and Co2FeSi Heusler alloys showed magnetic asymmetries in the integrated photoemission intensity of 0.35% and 0.43%. Thereby, 2PPE was excited by perpendicular incident polarization-modulated light, while the sample magnetization was orientated parallel and antiparallel to the laser beam by an external magnetic field. Asymmetries were measured by a phase-sensitive detection. Furthermore a magnetite thin film was investigated by frequency-tripled laser light in one-photon photoemission showing a magnetic asymmetry of 0.47%, which is much larger than the value 0.08% measured under two-photon-photoemission. The results are compared with earlier work using linearly polarized UV light [1] and circularly polarized laser light [2].

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O 43.6 Tue 18:30 Poster F

Transmission photoemission electron microscopy for lateral mapping of the X-ray absorption structure of a metalloprotein in a liquid cell — •Daniel Panzer[1], Christian Beck[2], Jochen Maul[1], Marco Möller[2], Heinz Decker[2], and Gerd Schönhense[1] — [1]Institut fuer Physik, Staudinger Weg 7, Johannes Gutenberg-Universitaet, D-55099 Mainz — [2]Institut fuer Molekulare Biophysik, Welderweg 26, D-55099 Mainz

The mechanism of oxygen incorporation in respiratoty proteins is subject of intensive discussion. We use photoemission electron microscopy in an X-ray transmission mode for full-field imaging of the X-ray absorption structure of copper in the respiratory metalloprotein hemocyanin KLH1. It contains 160 oxygen bonding sites. Each site reversibly binds one molecule oxygen between two copper atoms. In our setup, hemocyanin is dissolved in aqueous solution and enclosed in an ultra-high vacuum compatible liquid sample cell with silicon nitride membranes. The local X-ray absorption structure of the liquid sample is converted into photoelectrons at the microscope side of the cell acting as a photocathode. In this way, different copper valences are laterally distinguished under in vivo-like conditions, attributed to Cu(I) in the deoxy-state and Cu(II) in the oxy-state.

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O 43.7 Tue 18:30 Poster F

Time and energy resolved mulitphoton-photoemission microscopy of organic materials — •Florian Lindla, Gerhard Lilienkamp, and Winfried Daum — Institut für Physik und Physikalische Technologien, TU Clausthal, Leibnizstraße 4, 38678 Clausthal, Germany

Polystyrene (PS) microspheres and PS films on oxidized Pt surfaces were investigated by a photoemission-electron-microscope (PEEM) with 400nm (3.1eV) fs laser excitation. For pump-probe measurements the illumination system was equipped with a delay-line consisting of thin film polarizer plates as beam splitter/combiner.

Energy resolved measurements on PS microspheres (300nm in diameter) resulted in an energy distribution showing one peak, which slightly shifts to higher electron energies at higher laser intensities.

For further investigation first time resolved measurements were performed on an oxidized Pt surface with partial PS coverage (around 100nm thickness), revealing the expected 2-photon-photoemission