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Einladung zum Physikalischen Kolloquium

Montag, 12.12.2011
16:15 Uhr in N24/H13

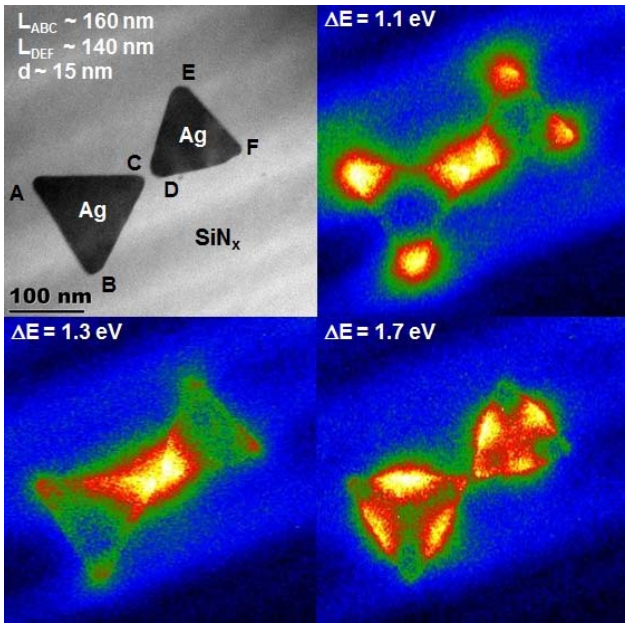
Professor Peter A. van Aken

Stuttgart Center for Electron Microscopy,

Max Planck Institute for Metals Research, Stuttgart

EELS and EFTEM of surface plasmons in metallic nanostructures

It is not until recently that it has become possible to image localized surface plasmon resonances (LSPRs) with a spatial resolution in the nanometer-range over the entire wavelength range from far infrared up to the ultraviolet [1]. In particular the far infrared regime has become more readily accessible by the introduction of electron monochromators which provide an energy resolution below 100 meV. In the work presented here we make use of an imaging energy filter which allows us to directly acquire images at selected energy-losses corresponding to LSPRs. So far this method has been applied on nanotriangles [2, 3], nanorods [4], arrangements of circular nanoholes [5, 6], and nanoslits [7] to directly map the plasmonic eigenmodes. We compare our experimental results with simulations based on the discrete-dipole approximation (DDA), 3D-Finite-difference time-domain (3D-FDTD), and finite-element (FEM) methods. The experiments were carried out at the SESAM microscope (Zeiss, Oberkochen, Germany) operated at 200 kV [8, 9]. Using energy-filtering TEM (EFTEM) and STEM-EELS we visualized resonant surface plasmon modes. These modes are characterized by equidistant field maxima along edges where the separations of field maxima allow us to measure the plasmon dispersion. Further results will be shown highlighting the coupling effect of plasmonic fields in closely spaced nanoobjects.



Ab 15.45 Uhr Kaffee, Tee und Kekse vor dem Hörsaal H13

Organisation: **Prof. Marti, Tel.: 23011**
Dr. Retzker, Tel.: 22902
Host: **Prof. Kaiser Tel.: 22951**

References

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[2] J. Nelayah, L. Gu, W. Sigle, C.T. Koch, I. Pastoriza-Santos, L.M. Liz-Marzán, P.A. van Aken: *Opt. Lett.* **34** (2009) 1003
[3] L. Gu, W. Sigle, C.T. Koch, B. Ögüt, P.A. van Aken, N. Talebi: *Phys. Rev. B* **83** (2011) 195433
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[5] W. Sigle, J. Nelayah, C.T. Koch, P.A. van Aken: *Opt. Lett.* **34** (2009) 2150
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