## Exhibitor Workshop
## Room Exhibit Hall - Session EW-WeL

### Exhibitor Workshop

**Moderator:** R.A. Childs, MIT

12:00pm **EW-WeL1 DIGITEL Ion Pump Controller user interface enhancements***, **T. Wynohrad**, D. Wetterlin,* Gamma Vacuum

Gamma Vacuum has changed to an ion pump controller that uses a ¼ VGA flat panel LCD touch screen. Functionality of DIGITEL lines remains similar with user requested enhancements. The new display allows for simplistic operation and programming of advanced ion pump and TSP controller features. Differences in operational and programming methods between the previous LED and LCD DIGITEL models will be discussed in detail for training purposes.

12:20pm **EW-WeL2 Renaissance of the PHI 5000 ESCA and PHI TOF-SIMS Systems***, **J. Hammond**, H. Iwai, S.R. Bryan, D. Watson, D. Doescher, J. Luedtke, N. Sekiya, M. Miller, R. Oiwa,* Physical Electronics

This presentation will describe the latest product developments at PHI for XPS and TOF-SIMS. New developments will be introduced which will expand the applications of both techniques to a wider range of scientific studies.

12:40pm **EW-WeL3 Nano, Micro and Macro Indentation of Coatings on the Same Tester***, **N.V. Gitis**,* CETR

A unique tester mod. UMT has been developed to allow for measurements of ALL COMMON hardness scales: instrumented indentation with continuous force-displacement monitoring and automatic Oliver-Pharr calculations of stiffness, hardness and Young modulus within an unmatched wide range from 100 nN to 1 kN, with Berkovich, conical and cube-corner indenters, Rockwell with both Brale and ball indenters, Knoop, Vickers, Brinell, sclerometry (both micro-scratching with lengths from microns to centimeters and nano-scratching with reproducible depths from 1 nm to 100 nm). Comparison of results per any hardness scales on the same specimens without their removal allows for in-depth investigations of surface properties. Multi-sub-loading-unloading cycles during instrumented indentation allow for studies of hardness versus depth of penetration.

1:00pm **EW-WeL4 Manufacturing and Imaging of Magnetic Nanostructures: FIB and SEMPA Combined with UHV SEM***, **J. Westermann**, M. Oertel, T. Berghaus, M. Maier, G. Schaefer,* Omicron NanoTechnology, Germany

The capabilities of Omicrons NanoSAM, Multiscan and Nanoprobe systems have recently been extended by two new techniques. On the one hand, the UHV Gemini SEM column has been combined with a Focussed Ion Beam source (FIB) for surface structuring. On the other hand, magnetic domains can be imaged with the SEMPA technique (SEM with Polarisation Analysis). The FIB is a fully UHV compatible version of the Orsay Canion 31+, with a spot diameter down to 5 nm. Together with the UHV Gemini column, this unique combination allows "Cross beam"TM applications under true UHV conditions in the 10-8 Pa regime. A newly developed SEMPA detector based on the SPLEED principle@footnote 1@ allows the imaging of magnetic domains with resolution in the 10 nm regime. The SEMPA detetctor has been developed in collaboration with the University of Hamburg. Compared to other polarisation detectors, for example such as Mott detectors, it offers a superior spin asymetry (A > 0.25) and overall detetcion efficency (figure of merrit: A2I/I0 > 6*10-5). Two systems with sligthly different instrumental combinations are currently under construction. These instruments will enable their operators to create "arbitrarily" shaped nanoscale structures and optimise their properties. Goals are for example related to the understanding of exchange coupling between layers in dependence of the pattern shape, or understanding the electronic transport in dependence of the domain structures on the nanoscale, both topics closely related to the fields of magnetic data storage and spintronics. The techniques SEM, FIB, SEMPA may also be extended with dedicated Low Temperature STM for Tunneling Spectroscopy or Spin Tunneling, as well as with a four probe for conductivity measurements of the magnetic structures, for example in dependence of the domain structure or applied magnetic fields. @FootnoteText@ @footnote 1@R. Frömter, H.P. Oepen, J. Kirschner Appl. Phys. A 76, 869-871 (2003).

1:20pm **EW-WeL5 The New NanoIndenter (tm) for Quantitative Surface Characterization with AFM***, **A. Bonilla**,* Asylum Research

Nanoindentation applications in AFM have been a popular technique for characterizing a wide range of materials. This workshop will discuss the new Asylum Research NanoIndenter for true quantitative measurements. Unlike other commercially-available cantilever-based (AFM), the NanoIndenter drives the indenting tip perpendicular to the sample. Displacement and force are measured with optimized AFM sensors that eliminate inaccuracies present in other systems. This allows for increased sensitivity and resolution and extremely accurate tip characterization. The technology and operation will be discussed and current examples of nanoindenting applications will be presented

1:40pm **EW-WeL6 Nanopositioning and Scanning Probe Microscopy for Extreme Environments***, **A. Kueng**, D. Haft,* attocube systems AG, Germany

attocube systems AG manufactures and distributes a complete line of easy-to-use probing stations, scanning probe microscopes and nanopositioning systems for temperatures in the range from 300 K down to 10 mK! The innovative instruments are also compatible with high vacuum and UHV environments as well as with high magnetic fields up to 15 T. Central to our proven suite of cryogenic probe stations and microscopes is our powerful combination of fully automated low temperature positioning devices with modular and flexible scanning probe sensors, designed specifically to meet the needs of today's low temperature and high vacuum research. Our instruments give users the ability to analyze samples down to the atomic level, even at Milli-Kelvin temperatures.

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