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**Hörsaal für Physik**

## **“Ultra High Vacuum Helium Ion Microscopy“**

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Helium Ion Microscopy (HIM) is a new technique that allows high resolution imaging of a wide range of materials. This charged particle scanning beam method uses He ions as primary particles. The interaction of energetic light ions with matter generates electrons, sputtered as well as back scattered particles and photons. All of these can be utilized for imaging and for exploring new contrast mechanisms. HIM has demonstrated unprecedented resolution both on conductive and isolating materials. It is well known for its high surface sensitivity when using secondary electrons generated by the impinging ions. Chemical sensitivity is possible via the backscattered He. Both qualitative element contrast maps as well as quantitative localized Rutherford Backscattering are possible. In addition Ionoluminescence allows to obtain information on the bandstructure and defects, such as color centers, by analyzing the emitted photons. I will present results obtained with the unique UHV HIM which overcomes some of the limitations present in other machines. The absence of carbon build up during imaging, well known from SEM and the increased surface sensitivity in backscatter mode will be discussed. In addition, I will present initial results on He induced bubble formation and Rutherford Backscatter analysis of CMOS samples. This research is supported by the Dutch Technology Foundation STW, which is the applied science division of NWO, and the Technology Programme of the Ministry of Economic Affairs.