

“Imaging and analytics in the Helium Ion Microscope”

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ABSTRACT

Helium Ion Microscopy (HIM) is providing best resolution Nobel gas focused ion beam (FIB) based imaging and nanofabrication capabilities. In this presentation I will briefly illustrate the application of HIM for its original purpose namely high magnification imaging of in particular non-conductive samples. This capability makes the method extremely useful for the uncoated imaging of biological samples such cells, bacteria and viruses. I will also show how channeling can be exploited to obtain crystallographic information with sub-nanometer sensitivity and information on buried structures can be obtained.

The final part will cover different aspect of GFIS based nanofabrication. Special emphasis will be put on low fluence materials properties modification with only negligible material removal. Examples in the part will include the modification magnetic, superconducting, electrical and optical properties in metals, semiconductors and 2D materials. However, GFIS based nanofabrication has also successfully been used for focused ion beam induced deposition (FIBID), high resolution resist patterning and high fidelity nanostructure fabrication.

CV

Gregor Hlawacek has obtained his PhD in materials science in 2007 from the Montanuniversität Leoben in Austria. He received the AT&S award from the ÖPG for the best PhD thesis in solid state physics in 2008. He pioneered Helium Ion Microscopy beginning from 2009 at the University of Twente, The Netherlands and moved to the HZDR in Dresden, Germany in 2014. Since 2019 he is group leader of the Ion Induced Nanostructures group at the IBC of the HZDR. His research interests are the development and application of HIM and FIB for materials science problems. He has published 88 peer reviewed papers, several book chapters with more than 1700 citations and edited the first full book on Helium Ion Microscopy. Currently he is chair of the COST Action CA19140 FIT4NANO and participates in several other German and European projects.