



The Abdus Salam
**International Centre
 for Theoretical Physics**
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Joint ICTP-IAEA Advanced Workshop on High Sensitivity 2D & 3D Characterisation and Imaging with Ion Beams

26 - 30 September 2016

Trieste, Italy

The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, in cooperation with the International Atomic Energy Agency (IAEA), Vienna, Austria, is organizing an **Advanced Workshop on High Sensitivity 2D & 3D Characterisation and Imaging with Ion Beams**, to be held in Trieste from 26 to 30 September 2016.

Accelerator-based analytical techniques using focussed ion beams are very powerful and versatile tools for elemental characterisation and mapping of broad range of materials. Beside their multi-elemental and fairly non-destructive feature, recent developments with regard of the imaging and detection systems make their performance exclusive both from the respect of sensitivity, accuracy, high lateral and depth resolution as well as 2D and 3D mapping. New applications have recently opened up by using swift heavy ions to create secondary ions and perform mass spectrometry on these, and to provide molecular information beyond the elemental analysis. These developments are extremely powerful spectroscopic tools, often providing complementary information on the structure and composition of materials, being applied to a wide range of scientific problems in material science, microelectronics, biology, biomedicine, geology, environmental science and archaeometry.

In the past few years, the advances in ion optics have allowed the use focused ion beams down to spot sizes in the micro- and nanometer range. This technical advancement has remarkably increased the analytical capability of conventional spectroscopic techniques for materials analysis, both in terms of spatial resolution and sensitivity to composition and physical-chemical properties. However, it is important to note that it also enhances effects which are more or less negligible with standard ion beam analysis (millimeter beamsizes). Other challenges are the analysis of nanostructures with standard Ion Beam Analysis (IBA) or multiple measurements using multiple detectors which become more and more widespread. Recent data evaluation code developments make it possible to improve the analytical results also at the sub-micrometer level, but it requires a coordinated effort to transfer the new knowledge into good practice in the laboratories.

IBA is considered to be a non-destructive technique. With increased beam brightness at small spot sizes however, radiation damage can take place. This Workshop aims to increase the awareness of the analysts and provide guidelines on how to minimize the effect of radiation damage during the analysis.

The Workshop seeks to review the state-of-the-art in the area of analysis. Theoretical basic principles, recent developments and applications and software developments will be covered. Beside lectures, practical sessions on data evaluation are planned. The Workshop will provide an advanced training and information exchange platform for early stage researchers interested in this important subject.

As a complementary technique, visit of the beamline Elettra-Sincrotrone Trieste is also included in the programme.

Participants will have an opportunity to present and discuss their results in a poster session. Appropriate time will also be allocated for scientific discussions in order to stimulate further development and co-operation among the participants.

PARTICIPATION

Early stage researchers (primarily post-docs and PhD students) actively working in the field of Ion Beam Analysis, including heavy ions, are invited to submit their application. Participants should present the results of their research in the form of a poster, and submission of relevant short abstract is mandatory.

GRANTS

A limited number of grants are available to support the travel and living expenses of selected participants, with priority given to participants working in a developing country and who are at the early stages of their career. There is no registration fee to attend the Workshop.

HOW TO APPLY FOR PARTICIPATION: until 29 April 2016, candidates can access the online application form from the Workshop website:

<http://indico.ictp.it/event/7638/>

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TOPICS:

- Total IBA: synergistic treatment of data from multiple IBA techniques
- Learning and using state of the art codes to affect the IBA analyses
- Pitfalls in IBA data analysis
- Beyond elemental analysis; MeV-SIMS High resolution PIXE
- Multi-elemental characterisation and 2D mapping
- Depth profiling and 3D tomography
- Radiation effects/Radiation damage
- Applications and case studies to material science, biology-biomedicine, geology, environmental science, art and archaeometry
- How to choose the best tools for analysis

DEADLINE

for requesting participation:

29 April 2016

