



IAEA Training Workshop on Ion Beam Driven Materials Engineering: New Roles for Accelerators for Quantum Technologies

Virtual Event

4–7 May 2021

Ref. No.: EVT2100732

Information Sheet

Introduction

Ion beam techniques (IBT), have been extensively applied for material analysis and modification by using ions in the keV-GeV energy range especially for electronic materials and devices and in the semiconductor industry. Actually, the knowledge and expertise gained over the last decades in the development of new methodologies for single ion implantation and detection, conjugated with recent advances in ion beam material analysis and modification at the nano-scale, envisage a potential high impact of IBT even in recently emerging quantum technologies.

Ion beam implantation is the primary technique to introduce doping atoms into a semiconductor to form devices and integrated circuit; now the development of new focusing and/or collimating systems allows single atoms to be addressed inside a given solid with nanometer precision and is, therefore, ideally suited for the fabrication of future quantum devices. On the other hand, ion beam analysis techniques for decades constitutes standard tools to provide chemical, structural characterization of materials, as well as functional analysis of electronic devices; similarly they have the analytical capability to play an important role for the measurement of the ion beam induced modification in materials for quantum technology, and offer unique opportunities to develop single ion detectors with spatio-temporal resolution at the nano-scale.

This training workshop is one of the outputs of the IAEA F11020 Coordinated Research Project on: Ion beam induced spatio-temporal structural evolution of materials: Accelerators for a new technology era. [The Future of Tech: Building Quantum Technology With Ion Beam Accelerators | IAEA](#)

Objectives

The workshop is intended to provide knowledge transfer on the latest technological developments to engineer new material properties with ion beams, with a specific focus on novel detector applications using quantum technologies.

Target Audience

The workshop is open for PhD students and early career researchers (i.e. up to 7 years after PhD degree) actively involved in ion beam techniques working in an accelerator laboratory and/or in the field of quantum technologies.

Working Language(s)

English.

Structure

The workshop will be virtual and organized as WebEx events. The WebEx events will consist of overviews of specific themes followed by open discussion among the participants. The timing and duration of sessions determined in part by the themes of the contributions and in part by the geographic distribution of participants.

Diversity: Geographical and gender balances are highly encouraged.

Topics

- Overview of the theory of radiation effects in materials and modelling of dynamics of vacancies and interstitials in collision cascades using molecular dynamics tools;
- Novel ion beams techniques for materials characterization and modification using keV to GeV ions;

- Case studies on how to tune/predict materials properties and create engineered structures by ion beams;
- Dedicated session to help newcomers and developing countries to extend their research portfolio towards quantum science;
- Engagement with the industry.

Participation and Registration

All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State, participants are requested to send the **Participation Form (Form A)** to their competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) for onward transmission to the IAEA by **24 March 2021**. Participants who are members of an organization invited to attend are requested to send the Participation Form (Form A) through their organization to the IAEA by above deadline.

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and technical matters.

Additional Information

Important Deadlines

24 March 2021	Nominations are to be sent to the IAEA through official channels together with a motivation letter according to the above instructions.
30 March 2021	Participants will be informed about the acceptance of their nomination.
12 April 2021	Letter of invitations will be sent to the accepted participants by the IAEA.
28 April 2021	WebEx invitations will be sent to all invited participants.
4 May 2021	Meeting begins.

Additional Requirements

In order to be selected to participate in this training works shop, it is required to send a Motivation Letter along with the completed Participation Form (Form A) to the scientific and administrative secretary.

IAEA Contacts

Scientific Secretary:

Ms Aliz Simon

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretary and correspondence on other matters related to the event to the Administrative Secretary.

Participation Form

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To be completed by the participant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary Aliz.Simon@iaea.org and to the Administrative Secretary M.Yaney@iaea.org.

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

Deadline for receipt by IAEA through official channels: 24 March 2021

Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms
Institution:		
Full address:		
Tel. (Fax):		
Email:		
Nationality:	Representing following Member State/non-Member State/entity or invited organization:	
If/as applicable: Do you intend to submit a paper? Yes <input type="checkbox"/> No <input type="checkbox"/> Would you prefer to present your paper as a poster? Yes <input type="checkbox"/> No <input type="checkbox"/> Title:		