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Group Scientific Visit on the Characterization of Archaeological Objects (ceramics, coins, glass) Using Ion Beam Analysis Techniques

23-27 September 2019

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PROSPECTUS

Title:	**Group Scientific Visit on the characterization of archaeological objects (ceramics, coins, glass) using ion beam analysis techniques**
Place:	Beirut, Lebanon
Date:	23-27 September 2019, 5 days
Deadline for nominations:	14 July 2019
Language:	English
Organizers:	The Lebanese Atomic Energy Commission (LAEC) in cooperation with the International Atomic Energy Agency (IAEA)
Course director name and address	Mohamad Roumie, Lebanese Atomic Energy Commission, Airport road, P.O. Box 11-8281, Beirut, Lebanon. E-mail: mroumie@cnrs.edu.lb, Tel: +961 1 450811 ext. 209.
Purpose of the course:	The purpose of this course is to provide to the participants basic and advanced information as well as practices on the use of ion beam analysis techniques (IBA) in the field of archaeology and their capabilities to reveal necessary and useful information about the investigated objects, such as provenance, authenticity and possibly fabrication techniques.
Expected Outputs	The participants will be able to know: - Basic information about the main IBA techniques that are widely used for the characterization of archaeological artefacts such as PIXE, PIGE and RBS (proton induced X-ray emission, proton induced gamma-ray emission and Rutherford backscattering spectrometry) - About the IBA capabilities and applicability in art and archaeology by analysing real samples that could be from the participants. - Procedures for collecting significant samples, handling and preparation of samples, when necessary.

- Extract the necessary information about the chemical composition and evaluate the data using dedicated computer software
- Apply statistical analysis on the extracted data and be able to interpret and present the results in a comprehensive study
- Some other relevant techniques that can be useful and complement IBA information such as Raman, IR, SEM and carbon-14 dating.
- Bridge the gap between archaeologists and nuclear analytical scientists

Scope and Nature of the course

The training course will include few lectures on ion beam analysis techniques. However, most of the time will be dedicated to practical and experimental sessions on sampling procedures, sample preparation, ion beam analysis of objects available primary from participants (ceramics, coins, glass and other artifacts), extract data on elemental composition and structure using software codes such as GUPIXWIN and SIMNRA, data evaluation and interpretation using statistical methods and how to contribute to a large database.

Background Information

Asia region is the host of most ancient civilizations and is reach cultural heritages that need to be deeply investigated in order to solve questions of identification, provenance, authenticity, fabrication techniques, restoration and preservation. Large scale campaigns of archaeological excavations were and are still undertaken that unearthed remains dating thousands of years that belong to many cultures such as Chinese, Buddhist, Hindu, Persian, Chaldean, Babylonian, Assyrian, Phoenician Hellenistic, Roman, Byzantine, Islamic, etc. Furthermore, these civilizations were interacting and have established commercial routes such as the “Silk Road”. In fact, pottery is the most abundant archaeological artifact and therefore it is the most studied by archaeologists nowadays, since its characterization can reveal several related information and history. Nevertheless, other artifacts such as coins, glass or stones can also significantly contribute to such studies.

Accelerator based analytical techniques such as IBA and in particular PIXE, PIGE and RBS can play a major role in the investigation of materials pertinent to art and archeology. They have the advantages to be multi-elemental (can cover almost all the elements within ppm sensitivity), relatively fast (few minutes per sample), which is needed when many samples should be studied, and are in general non-destructive. In addition, the analysis of precious, fragile or bulky objects (statues, gemstones, paintings and manuscripts) can be done in air with the possibility of 2D-3D imaging.

Participation and qualifications:

The group scientific visit is open to a maximum of 7 participants from Asia countries. The participants are expected to be physicists, chemists, engineers, curators or archaeologists who are willing to conduct research studies, or are already involved, by applying nuclear analytical techniques, such as Ion Beam Analysis, in the field of art and archaeology. As all the activities will be conducted in English, participants should have sufficient proficiency to follow lectures.

Application procedure:

Candidates wishing to apply for this event should follow the steps below:

1. Access the IAEA TALEO page (https://iaea.taleo.net/careersection/ex/jobsearch.ftl) and complete the Candidate Profile.

2. Be registered on the Nucleus page of the IAEA (https://nucleus.iaea.org/).

3. Through Nucleus, access the InTouch+ platform where the Profile is completed (My Profile tab) (https://nucleus.iaea.org/Pages/InTouchPlus.aspx).
   NOTE: The email used for TALEO and Nucleus must be the same. If not, the candidate's profile will not appear complete.

4. On the InTouch + platform, under the 'My InTouch +' tab, the candidate needs to:

   a. select the institute / organization that he/she works at / represents ('My Institute' section);

   b. click on the link called **'Refresh Personal History Form'** to update the system, ***otherwise the nominations submitted will have these fields empty and it will not be possible to evaluate them during the selection of candidates*** ('IAEA Recruitment Platform' section).

   NOTE: Once the above steps are finalized, the candidate's profile will appear as completed and he/she can apply for Technical Cooperation events.

5. In the InTouch+ platform (https://intouchplus.iaea.org), in the 'Applications' tab, search by the event number provided in the invitation.

   The help for each step is located at the top of the page. For additional help on how to register, create a profile and apply for an event, please refer to the online guide and training videos available under the following links: how-to guide and training videos. Any issues or queries related to the new system can be addressed to InTouchPlus.Contact-Point@iaea.org or TC-AIPS-PL4.Contact-point@iaea.org.

Should this not be possible, applicants may download the Nomination Form for the TN from the IAEA website https://www.iaea.org/services/technical-cooperation-programme/how-to-participate.

Applications should contain sufficient information to establish that the nominees have the required qualifications. Please note that the information regarding LANGUAGE SKILLS, EDUCATION AND WORK EXPERIENCE is exported from TALEO. If an applicant's profile in TALEO is not updated, the information in INTOUCH+ for these sections appears as empty and the candidates cannot be evaluated. Completed applications need to be endorsed by the relevant national authority, i.e. the National Liaison Office and submitted through the established official channels.

Administrative and financial arrangements

Nominating Governments will be informed in due course of the names of the candidates who have been selected and will, at that time, be given full details on the procedures to be followed with regard to administrative and financial matters.

Selected participants from countries eligible to receive technical assistance will be provided with a round trip economy class air ticket from their home countries to Beirut and a stipend sufficient to cover the cost of their accommodation, food, and minor incidentals.

The organizers of the training course do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is traveling to and from or attending the course, and it is clearly understood that each Government, in nominating participants, undertakes responsibility for such coverage. Governments would be well advised to take out insurance against these risks.