

IAEA

International Atomic Energy Agency



Short Scientific Visit to LABEC Laboratory of INFN

9-21 February 2015

Granted as part of
RAS0072 Project

Evaluating and Mapping Air Pollutants Using Nuclear Analytical Techniques

Funded by **IAEA**

Brief Scientific Report

Submitted to **IAEA**

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by

Dr. Hanan Sa'adeh

Assistant Professor, The University of Jordan

Hanan.saadeh@ju.edu.jo

General Information

Name of scientific visitor

Hanan M. Sa'adeh

Scientific Visit Code No.

C6/JOR/14057V

Address in host country

Hotel Andrea, Piazza Indipendenza, 19, 50129 Firenze

Starting date of programme in host country

9 February 2015

Ending date of programme in host country

21 February 2015

Name and full address of institution where the visit took place

LABEC Laboratory of INFN in Florence, via Sansone 1, 50019 Sesto Fiorentino (Firenze) – ITALY

IAEA TC Project number

RAS0072

Name of the project counterpart

Dr. Dia-Eddin Arafah

My present position, duties, and responsibilities

I work as an Assistant Professor of Atomic Physics at the University of Jordan, teaching different physics courses for students of physics major, in addition to teaching general physics courses and introductory physics lab courses for students of science and engineering majors. I also belong to the Atomic Physics Laboratory and the Atomic Physics Group at the University of Jordan Van de Graaff Accelerator (JUVAC) as a researcher, working at RBS, PIXE, and COLTRIMS beamlines.

Description of the programme accomplished

Objectives

The objective of this short visit was to get acquainted with the basic and advanced information on the effective utilization of Ion Beam Analysis (IBA) instrumentations for the determination of the elemental composition of Air Particulate Matter (APM), in addition to analyze some aerosol samples that were collected in the countries that are currently participating in the project.

Methodology: Activities Carried out during this Visit

**** Tuesday 10 February 2015.**

(Lesson): Introduction to IBA methods for elemental characterization of APM samples.

**** Wednesday 11 February 2015.**

(Laboratory):

- 1- Training on EC/OC analysis (with the Sunset Laboratory instrument).
- 2- Visit to the LABEC laboratory.

**** Thursday 12 February 2015.**

(Laboratory):

- 1- Training on gravimetric analysis and sample preparation.
- 2- Visit to the Ion Chromatography laboratory in the Analytical Chemistry Department.
- 3- PIXE measurements of aerosol samples.

**** Friday 13 February 2015.**

(Laboratory): PIXE measurements of aerosol samples and calibration standards for quantitative analysis.

**** Monday 16 February 2015.**

(Lesson):

- 1- Introduction to GUPIXWin software for PIXE spectra analysis.
- 2- Hands-on training on quantitative analysis of collected PIXE spectra using the GUPIXWin software.

**** Tuesday & Wednesday 17-18 February 2015.**

(Lesson): Hands-on training on quantitative analysis of collected PIXE spectra using the GUPIXWin software.

**** Thursday & Friday 19-20 February 2015.**

(Lesson):

- 1- Introduction to EPA Positive Matrix Factorization code for source apportionment.
- 2- Hands-on training on source apportionment (with a provided data set).
- 3- Exam.

Assessment of the value of the visit for my future work in my home country

It was a great pleasure for me to visit the LABEC laboratory of INFN and to perform measurements and data analysis of my aerosol samples using the IBA instrumentations (namely PIXE) of LABEC laboratory. The theoretical lectures as well as the hands-on sessions presented during this visit provided us with basic and advanced information on the effective utilization of IBA instrumentations for the elemental composition of APM samples. This experience will be of great benefit for my home university as we are currently working on optimization and modification of PIXE beamline at JUVAC (the University of Jordan van de Graaff accelerator). As an added value to the IAEA RAS0072 project, we, the



Hanan Sa'adeh at LABEC laboratory.

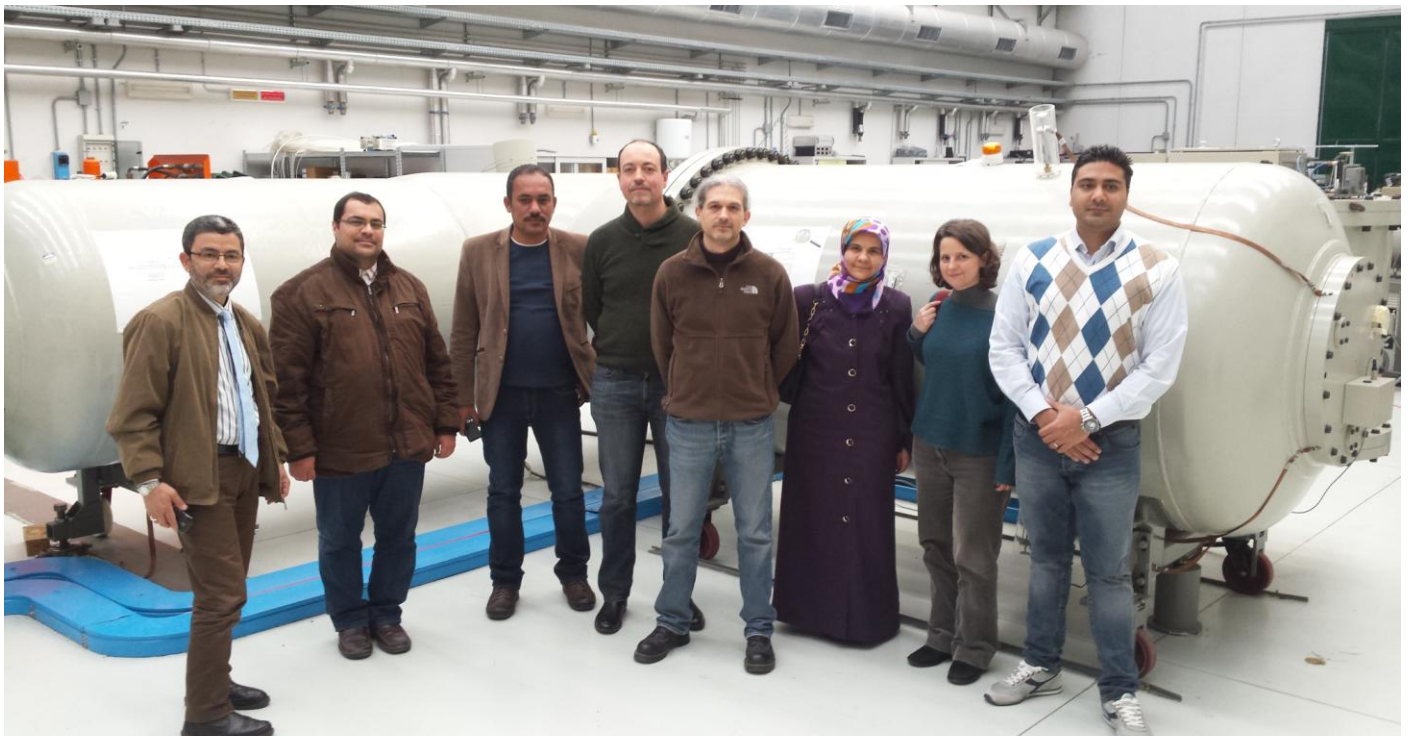
visiting fellows from the different member states, are working on data interpretation of the samples analyzed during this visit, in order to be published soon as a regional work.

Comments on the administration of the scientific visit programme

- 1- The host institution was very useful to fulfill the aims of RAS0072 project.
- 2- The programme undertaken and the guidance through the visit were really excellent.
- 3- The facilities were available together with guidance from experts.
- 4- Living arrangements were very good. The help of Massimo in confirming the hotel accommodation is highly appreciated.
- 5- The assistance received from IAEA was excellent and highly acknowledged.

[Acknowledgement and Appreciation](#)

I greatly acknowledge IAEA for funding this visit through RAS0072 project. The efforts of Dr. Massimo Chiari at LABEC laboratory in organizing the agenda of this visit are highly appreciated. I would like to thank the many people in LABEC who gave of their time to explain collection and interpretation of data. I especially thank Silvia Nava, Alessandro Migliori, Giulia Calzolari, and Martina Giannoni. I also thank my colleagues from ARASIA member states, who accompanied me in this visit, for their good companionship during travel and stay at Florence. Last but not least, I am grateful to my home university, the University of Jordan, for the moral and logistic support that facilitated my visit to LABEC laboratory.



At LABEC laboratory: from right to left, Ali Srouf, Silvia Nava, Hanan Sa'adeh, Massimo Chiari, Alessandro Migliori, Maitham Sultan, Salah Rihawy, and Yousef Abusalha.

[This report was submitted by Hanan Sa'adeh, on 21 March 2015, Amman, Jordan.](#)