

Report on Expert Visit to Pakistan

Name and address of expert	Prof. Dr. Syed M. Qaim Institute of Nuclear chemistry Research Centre Jülich Germany
Programme	“President’s Programme for the Care of Highly Qualified Overseas Pakistanis (PPQP)” National Talent Pool Government of Pakistan Islamabad, Pakistan
Host	Department of Physics Government College University (GCU) Lahore, Pakistan
Dates of visit	12 March to 1 April 2012
Contact persons at host institution	Prof. Dr. Hassan A. Shah (Chairman of the Department) Prof. Dr. Riaz Ahmad (Director CASP) Prof. Dr. G. Murtaza (Salam Chair) Dr. Mazhar Hussain (Assistant Professor)
Aims of assignment	(1) To give a condensed lecture course (2) To deliver seminar lectures on a few modern research topics (3) To discuss technical matters with scientists and to guide a few researchers (4) To guide in preparation of a manuscript on research results for publication
Work performed	1. A condensed course of 5 lectures (each about 1.5 h) on the topic: “ <i>Scientific and environmental aspects of energy production (with emphasis on nuclear energy)</i> ” was held. About 120 persons got registered for the course, mostly M. Phil. and Ph.D. students from several departments of GCU, but some from a few other institutions in Lahore as well. The lectures were well attended and well received and there was quite some discussion after each lecture. Written lecture notes were provided. At the end of the course a written test was given. About 80 persons qualified. They shall receive a special certificate from the University.

2. Following **seminar lectures** were delivered.
 - i. *Nuclear sciences at the service of mankind*
Bokhari Auditorium, GCU Lahore, 19 March 2012
(more than 300 participants)
 - ii. *Development of novel radionuclides for medical applications*
Department of Chemistry, GCU Lahore, 26 March 2012
(about 150 participants)
 - iii. *Nuclear sciences at the service of mankind*
COMSATS Institute of Information Technology, Lahore,
28 March 2012
(about 100 participants)

3. **Technical discussions** with several scientists were held in the Departments of Physics and Chemistry and in the Centre for Advance studies in Physics (CASP). The major themes were improvement of the newly introduced course on *Applied Nuclear Physics and Nuclear Data* in the Department of Physics, the initiation of a course on *Nuclear Methods of Analysis* in the Department of Chemistry and the utilization of the 2 MeV pelletron at CASP for nuclear data measurements.

Regarding nuclear data measurement at CASP, two approaches were considered: One is to study nuclear processes very near to their thresholds using the available low-energy protons and the second is to produce neutrons via the p/Li reaction. The quasi-monoenergetic neutrons could then be used to study some nuclear reactions. Feasibility studies related to both approaches should be carried out. Efforts should be made to procure the relevant radioactivity detection equipment.

Some guidance was provided to a Ph.D. student at an advanced stage of his research in the field of nuclear data evaluations. A few possible research topics for two prospective Ph.D. applicants were also discussed

4. **Preparation of a manuscript** for publication in an international journal was initiated. This is based on part of the on-going research work completed at the GCU Lahore in the field of nuclear data. The title is : “ *Evaluation of charged particle induced reaction cross section data for production of the therapeutic radionuclide Cu-67*” and the authors will be M. Hussain, S. Sudár, M.N. Aslam and S. M. Qaim. The first draft has been completed and further refinement is going on. It is expected that the manuscript will be available in the final form for submission to an international journal in the beginning of May 2012.

Other activities

After the end of the assignment at the GCU Lahore, the expert travelled on 1 April 2012 to Islamabad on an invitation of the Pakistan Academy of Sciences, of which he is a Foreign Fellow. In Islamabad he visited the Administrative and Project Offices of the National Talent Pool, had a stimulating discussion with the Secretary of the Ministry of Professional and Technical Training, and discussed scientific matters with a large number of scientists from Pakistan Institute of Nuclear Science and Technology (PINSTECH) and several Universities. He also delivered the following two lectures.

- a) *Some special aspects of education and scientific research in Germany*
Preston Institute of Nanotechnology, Islamabad, 2 April 2012
(about 35 participants)
- b) *Novel radionuclides for medical applications*
Pakistan Academy of Sciences, Islamabad, 3 April 2012
(about 100 participants)

The lecture was followed by a dinner which the Academy hosted in honour of the speaker.

Appraisal of the visit

All the aims of the assignment appear to have been met: the condensed course was successfully completed, the seminar lectures were well received, the technical discussions may help in improving a few courses in the Departments of Physics and Chemistry, the experimental work proposed may open up a new research channel at the pelletron, the researchers got some more guidance, and the draft of a forthcoming international publication could be prepared. The visit may thus be considered as successful.

Acknowledgements

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Lahore/Islamabad
3 April 2012

Prof. Dr. Dr. h. c. mult. Syed M. Qaim
NTP Expert

Distribution

1. Mr. Hameed Ullah Khan, DG, NTP, Islamabad
2. Prof. Dr. Hassan A. Shah, Chairman, Department of Physics, GCU Lahore.
3. Dr. Mazhar Hussain, Asstt Prof., Department of Physics, GCU Lahore.
4. Prof. Dr. H. H. Coenen, Director, Institute of Nuclear Chemistry, Research Centre Jülich, Germany

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