FP7 "Marie Curie Initial Training Networks"

ENTERVISION
Research Training in 3D Digital Imaging for
Cancer Radiation Therapy

Job Vacancy:

"Modeling of in-beam PET and SPECT imaging devices"

Context of the recruitment

In the framework of the European project "ENTERVISION"- Research Training in 3D Digital Imaging for Cancer Radiation Therapy, the National Institute for Nuclear Physics (INFN, Italy) will host one Early Stage Researcher (ESR) for 36 months. The researcher will be offered specific training in simulation and experimental tools to model digital imaging devices applied to Cancer Radiation Therapy.

Scientific background

The vision on a future high-precision radiation therapy utilizing either particle or photon beams is a treatment on a technological level which allows for:
(1) obtaining information on relevant tumour parameters (volume, position, topology, density - also of the surrounding tissue) during every moment of therapeutic irradiation;
(2) adapting the treatment plan in real time; and
(3) initiating the appropriate control of the irradiation device to compensate for any deviations from the original treatment plan that compromise a tumour conformal dose delivery.
The "European training network in digital medical imaging for radiotherapy" (ENTERVISION) has been established in response to the critical need for reinforcing research in online 3D digital imaging and the training of professionals in order to deliver some of the key elements and building blocks for realizing the vision for early detection and more precise treatment of tumours.

Specific Objectives in the ENTERVISION program

ENTERVISION is an interdisciplinary (physics, medicine, electronics, informatics, radiobiology, engineering) multinational initiative, which has the primary goal of training researchers who will help technical developments at a pan-European level.

The main scientific objective of the present job in the ENERVISION framework is to provide common tools to model Emission Tomography, coupled to an assessment of the detection techniques, in the perspective of in-beam control, imaging and dosimetry during ion therapy. Indeed, modeling based on simulations is of crucial importance at all stages of the elaboration of an imaging system, and any experienced researcher involved in particle detection and medical imaging can be expected to master such modeling aspects.

Job Description

The candidate will participate in the development and validation of the interaction models contained in FLUKA as far as the prediction of secondary particles, fragments and residual nuclei production are concerned in view of analysis of in-beam PET. In the same context, he/she will support in the development and validation of RQMD and BME models in FLUKA describing the nucleus-nucleus interaction in the energy range for therapeutic beams

The candidate will also participate to the simulation of the complete patient irradiation and to the investigation of detector design options and reconstruction aspects.

He/She will support in:
- Monte Carlo application development in specific problems of ion therapy and its monitoring using PET/SPECT
- integration of radiobiological model in Monte Carlo (FLUKA environment) and its use for Treatment Planning verification.

Finally, the candidate will participate to an experimental program to measure the differential cross section for production and transport of light particles in conditions relevant for ion therapy. The experiments will be performed in collaboration with the large-scale physics experiment FIRST at GSI.

In the context of ENTERVISION programme, the candidate will participate to trainings, workshops and conferences organized within the network.

Requested Profile
- Graduated Physicist

- Education
    o Fundamental Nuclear Physics
    o Interaction of radiation with matter
- Experimental capabilities
    o Basic on Instrumentation for particle detectors
- Computer skills
    o Knowledge of Monte Carlo simulation programs, Software for Data Analysis and Image Processing, C/C++ Programming languages, UNIX/LINUX OSs
- Interests
    o Interested in an international and multidisciplinary working environment
    o Interested in a scientific career in an expanding field
- English fluent

How to apply

Verify that you fulfill the FP7 Marie Curie ITN Eligibility conditions
Send an application to:

Prof. Giuseppe Battistoni, Director of INFN Milano, via Celoria 16, 20133 Milano, Italy,
tel +39 02 50317649
fax +39 02 70601811
e_mail : Giuseppe.Battistoni@mi.infn.it

Your application must contain:
1. Application letter with motivations
2. Curriculum vitae
3. A record of technical/scientific publication
4. Three letters of recommendation

The application documents can be also sent by e_mail
The advisors must separately send their recommendation letters

APPLICATION DEADLINE: September 1st 2011

For questions please contact
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fax +39 02 70601811, e_mail : Giuseppe.Battistoni@mi.infn.it
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