Australian Institute of Physics
NSW Branch (June Public Talk)

"Angels and Demons: The real CERN"

Dr Susanna Guatelli

School of Engineering Physics, University of Wollongong

Tuesday 29th June 2010 @ 6.00PM

At the

Slade Lecture Theatre, School of Physics, University of Sydney

Public talk arranged by: The Australian Institute of Physics (NSW Branch)

Entrance is FREE

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Summary of talk:

At end of the Second World War, that caused a significant brain drain from Europe to United States, the European scientific community was fragmented and with scarce resources. It was in this moment of difficulty that a group of visionary physicists, as Raoul Dautry, Pierre Auger and Lew Kowarski in France, Edoardo Amaldi in Italy, and Niels Bohr in Denmark, proposed the revolutionary idea of creating an European atomic physics laboratory. CERN, officially born in 1954, represents a symbol of fruitful collaboration among different states and cultures, to discover the fundamental mysteries of particles physics and of the universe. Particularly in the last few years, CERN attracted an increasing attention of artists, writers, and general public, stimulating the imagination on what is CERN and its research. This media's interest produces on one side curiosity with respect to particle physics and the mysteries of the universe, on the other side misconceptions and false information about CERN life, its research, laboratories and the scientists working there. In this talk I will introduce you briefly to CERN site and to a typical CERN-day. The real CERN High Energy Physics (HEP) research is fundamental not only for our understanding of the universe, but has also a crucial impact in industry world, in other research domains as medical physics and space science, and in our everyday life. This happens thanks to the CERN Technology Transfer program, key element of CERN policy, devoted to the transfer of CERN research achievements to other science domains and European industry. Examples of CERN Technology Transfer are the World-Wide-Web, the GRID, the application of detectors (i.e. GEM and BGO) and software tools born for HEP (as Geant4 Monte Carlo code) to other domains of research.This talk will be mainly devoted to the Technology Transfer from CERN to the Centre of Medical Radiation Physics (CMRP), of the University of Wollongong, NSW, led by

Prof. Anatoly Rosenfeld. I will illustrate our research devoted to Medipix2 chip, originally invented for pattern recognition in tracking of particles in the LHC, and nowadays under investigation at CMRP, as possible neutron dose meter, for radiation protection in ground-base labs, aviation and space. At CMRP we use intensively the Geant4 Simulation Toolkit, born for HEP, and nowadays widely used in medical physics and space science research. Geant4 has advanced capability in geometry modelling, able to describe in detail complex detectors as, for example, CERN CMS and ATLAS, complemented by a sophisticated functionality in physics modelling, from HEP domain, down to few eV, typical of nanodosimetry. This power of physics modelling over a wide energy range is possible thanks to the flexibility and easy extensibility of the Toolkit, deriving from the adoption of the Object Oriented Technology. At CMRP we use Geant4 in a wide set of medical physics applications, from external beam therapy and protontherapy to brachytherapy, to investigate possibilities of enhancement of cancer treatment. We use Geant4 to investigate the effect of radiation at nanoscale level, thanks to the adoption of the Geant4 Very Low Energy extensions. We characterise novel detectors for radiation protection in ground-base labs, aviation and space, as SOI microdosimeters.

Brief Biography of the Speaker:

Dr Susanna Guatelli, has research activities in Medical Radiation Physics. Susanna has completed her PhD in physics at University of Genova, Italy. Her main research activities are in the field of Monte Carlo simulations in radiation physics with application of the GEANT radiation transport code. She has completed research at CERN in the simulation of radiation detectors for HEP and radiation shielding of spacecraft for space exploration missions as well as in dosimetry for IMRT, brachytherapy and Proton Therapy. In the last couple of years Susanna has been a postdoctoral fellow with the radiation detection group at ANSTO.

Detailed Schedule for Tuesday, 29th June 2010:

- ***6:00-6.30 pm*** **REFRESHMENTS, Slade Lecture Theatre.**
- ***6.35-7.30 pm*** **LECTURE by Dr Susanna Guatelli.**
- ***8.00 pm*** **DINNER with the Speaker at Buon Gusto (Italian), 368 Abercrombie Street, Chippendale.**
  E-mail Dr Fred Osman (fred_osman@exemail.com.au) if you will be able to join us for dinner.

Travel Directions:

- Train to Redfern station and walk to the **School of Physics**.
- Buses 422, 423, 426, 428, 448, and 450 from Circular Quay to City Road / King, or 412, 435, 438, 470, 483 etc. along Parramatta Road from Circular Quay.
- Drive and park in various parking lots. You will need to pay for parking **($6 flat-rate after 4 pm)** and display the ticket in your car. You may also find parking places on public roads outside the Uni.

Event sponsored by:

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