

**Dottorato di Ricerca in Fisica dell'Università degli Studi di Messina**

4 Marzo 2010, ore 15.00, Aula E. Majorana, Dip.to di Fisica,  
Ctr. Papardo Sperone, 31, S. Agata, Messina

**Dr. Ernesto Amato**, Physics PhD

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Titolo del Seminario:

**Applications of Monte Carlo method in medical physics and radiological protection**

**Abstract**

Monte Carlo simulation of particle transport and interaction in matter finds growing applications in medical radiation physics and advanced radiological protection.

Dosimetric applications in radiation therapy span from internal dosimetry in radionuclide therapy of nuclear medicine, to treatment planning in external beam radiation therapy with photons, electrons or fast heavy ions, to the assessment of radiation dose distribution in heterogeneous media such as lungs, bones or renal parenchima, or microdosimetry at the cellular level.

Radiological protection studies can concern the design of radiation shields and the assessment of occupational dose from manipulation of radioactive materials, operation of particle accelerators or reactors.

After a general introduction, we will present our current studies and applications of Geant4 Monte Carlo code from CERN to internal dosimetry in therapeutic nuclear medicine, shielding of beta emitters, and dosimetry in Computed Tomography, developed in collaboration between the Department of Radiological Sciences and the Department of Physics of our University.