Contribution ID: **115** Type: **oral presentation**

Benchmarks of medical dosimetry on the grid

Monday, September 3, 2007 3:20 PM (20 minutes)

Computational tools originating from high energy physics developments provide solutions to common problems in other disciplines: this study presents quantitative results concerning the application of HEP simulation and analysis tools, and of the grid technology, to dosimetry for oncological radiotherapy.

The study concerned all the three major radiotherapy techniques: therapy with external beams from a medical linear accelerator (in particular, the modern technique or intensity modulated radiotherapy), brachytherapy with internal or superficial radioactive sources, and hadrontherapy with a proton beam. Geant4-based simulation applications developed for three realistic use case highlight the high precision dose calculation achievable; the simulation is complemented by AIDA-compliant analysis tools for the manipulation of dose distributions relevant to clinical usage. The application design exploits DIANE for transparent execution in sequential and parallel mode, either on a local farm or on the grid and GANGA as a grid user interface.

Benchmarks for execution on the grid are presented; they highlight the capabilities and current limitations for exploiting the grid in real-life applications in all major branches of
oncological radiotherapy.

Computational tools for dosimetry based on HEP software systems couple high precision, speed suitable to clinical environments and low cost: therefore, they represent an alternative to commercial products of particular interest to developing countries for oncologial radiotherapy or radiation protection applications.

Primary authors: LECHNER, Anton (Tech. Univ. Wien); DIROSA, Francesco (INFN LNS); CUTTONE, Giacomo (INFN); RUSSO, Giorgio (INFN LNS); MOSCICKI, Jakub (CERN); Dr PIA, Maria Grazia (INFN Genova); CIRRONE, Pablo (INFN LNS); MENDEZ LORENZO, Patricia (CERN)

Presenter: Dr PIA, Maria Grazia (INFN Genova)

Session Classification: Collaborative tools

Track Classification: Collaborative tools