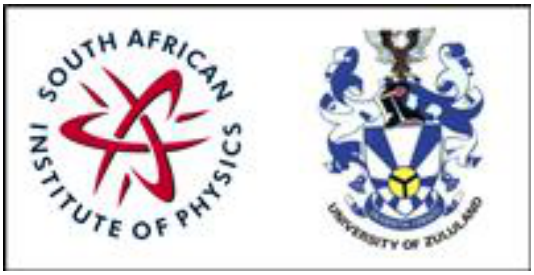

Contribution ID: **46** Type: **Oral Presentation**

Cytogenetic analysis of Co-60 γ-radiation-induced chromosome damage and simulations using the Geant4 Monte Carlo toolkit

Wednesday, 10 July 2013 15:40 (20 minutes)

Abstract content
   (Max 300 words)

The study investigates the determination and quantization of radiation damage on a cellular level and the replication of this energy deposition using the Geant4 Monte Carlo toolkit, developed for particle transportation simulations at CERN. The detection of micronuclei in binucleated cells was used to analyse the effects of the radiation. Results from micronucleus assays of rat brain endothelial and Chinese hamster ovary cells that have been irradiated with gamma rays, produced by a Co-60 teletherapy unit at iThemba LABS, are presented. Linear-quadratic dose response curves were determined for both cell lines and compared to those of other ionizing radiations. Additionally discussed are the simulated results of the Co-60 setup, irradiation and other relevant features offered by the Geant4 toolkit. Finally, prospective microdosimetric studies and simulations of damage caused by DNA-incorporated I-123 will be mentioned.

Apply to be
 considered for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

MSc

Main supervisor (name and email)
and his / her institution

Richard Newman, rtnewman@sun.ac.za
Department of Physics, Stellenbosch University

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Mr FOURIE, Hein (Stellenbosch University)

Co-authors: Prof. SLABBERT, Kobus (iThemba LABS); Mr BEUKES, Philip (iThemba LABS); Prof. NEWMAN, Richard (Stellenbosch University)

Presenter: Mr FOURIE, Hein (Stellenbosch University)

Session Classification: NPRP

Track Classification: Track B - Nuclear, Particle and Radiation Physics