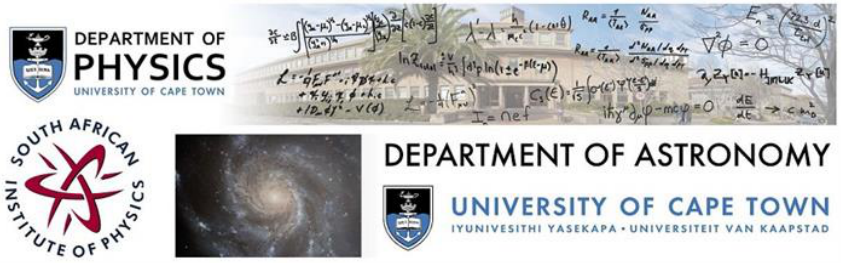

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Radiation Shielding Calculation using FLUKA transport code for Radioactive-ion Beams Facility at iThemba LABS.

Wednesday, 6 July 2016 14:20 (20 minutes)

Abstract content
   (Max 300 words)
Formatting &
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The Separated Sector Cyclotron (SSC), which is the core and the primary driver of iThemba LABS, got it shared use being overloaded since there is a growing demand for production of radioactive isotopes for nuclear medicine, nuclear physics research, and cancer treatment. This has therefore lead to the need of the facility advancement to relieve the SSC.

Therefore, the new Radioactive Ion Beams (RIBs) phase development was then proposed to respond to these demands. The RIBs facility proposal includes a 70 MeV negative ion cyclotron which will be the primary driver of the 5 new proposed Radioisotope production stations and two experimental areas for nuclear physics and material science research.

To test the feasibility and the advantages of the overall RIBs project, the RIBs Demonstrator vault (RIBs testing facility) project was also proposed as the first step towards the big development which will include buying new cyclotron accelerator.

The RIBs facility will produce the strong sources of ionizing radiation, and the challenging part of the produced ionizing radiation is the neutral/uncharged radiation (neutrons and photons). This kind of radiation doesn't interact electromagnetically, and when this kind of radiation interact, it interacts & ionizes indirectly which makes it not to be easily handled.

So this project is aiming to use Monte Carlo simulations to calculate the optimal design, the design that will lower to radiation to recommended levels, for the test facility that will be constructed in year 2017 at iThemba LABS.

The ideal computer code to simulate the optimal design with adequate shielding walls thicknesses is FLUktuierende KAscade (FLUKA), which is a fully integrated particle physics Monte Carlo simulation package. FLUKA is able to calculate activation on top of shielding, which makes it the chosen code for this project.

Apply to be
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Yes

Level for award
 (Hons, MSc,
   PhD, N/A)?

MSc

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

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Email: bark@tlabs.ac.za
Institution: iThemba LABS

Would you like to <br> submit a short paper <br> for the Conference
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