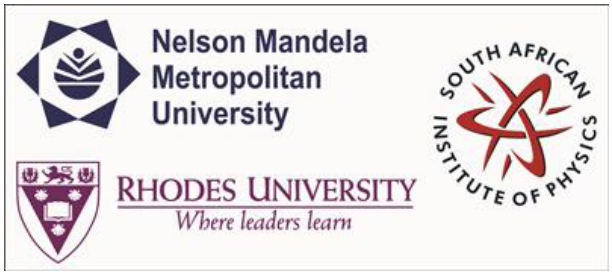

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Determination of a neutron beam fluence energy distribution using multichannel unfolding code MAXED

Wednesday, 1 July 2015 16:10 (1h 50m)

Abstract content
   (Max 300 words)
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Detail knowledge of fast neutron beams fluence energy distributions are crucial in nuclear applications like radiation protection and neutron radiotherapy for the treatment of cancer at nuclear research facilities, for example iThemba LABS because neutron interactions with matter are energy dependent. These neutron beams fluence energy distributions can either be measured or calculated. Experimental methods like time-of-flight, recoil spectrometry, threshold spectrometry and methods based on neutron moderation are used to measure neutron beams fluence energy distributions.

The time-of- flight method is the most reliable and accurate method. However, in situation where the time-of-flight method cannot be applied, for example in water phantom (simulating human tissue) where the neutron flight path due to scattering is unknown, neutron fluence energy distributions are obtained from pulse height distributions by unfolding with unfolding codes that includes Gravel HEPRO, MAXED, FRUIT and many others.

In this work neutron beams of energy ranging up to 64 MeV were produced at the iThemba LABS neutron time-of-flight facility by bombarding a 66 MeV proton beams onto either a Li-target or a Be-target or a C-target. Pulse height distributions of the neutron beams in air were measured and unfolded into neutron fluence energy distributions using the unfolding code MAXED. Preliminary results obtained for the Be-target will be presented and discuss.

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