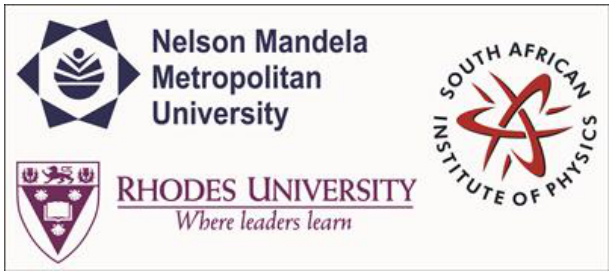

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Optimization of a small-angle neutron scattering instrument using the VITESS model

Friday, 3 July 2015 10:20 (20 minutes)

Abstract content
   (Max 300 words)
Formatting &
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A small-angle neutron scattering (SANS) instrument is a facility that uses sub-thermal energy (<25meV) neutrons extracted from a reactor or spallation source to study materials at mesoscopic levels. Putting such an instrument in place requires specialised equipment so as to achieve a clean narrow neutron beam spot (<5mm) at considerable distances (>30 m) from the primary source. A neutron beam is channelled from the source through collimators and guides. These components should be chosen such that these stringent conditions are achieved; a process Necsa is currently involved in installing a low-background SANS instrument at its SAFARI-1 research reactor.

VITESS is a tool for simulating neutron scattering instruments at pulsed and continuous sources. It is supported by a graphical user interface which generates and controls command lines according to a given input. A simulation comprises one or more modules co-working sequentially. Each module passes its neutron data to the following one. VITESS is currently being used to model neutron scattering beam lines to be installed at European Spallation Source (ESS) Project under construction in Sweden. Most of the recently installed SANS beam lines (e.g. BILBY at ANSTO), V16 at HZB) were built guided by this tool, as every component to be installed can be virtually defined and inspected to reflect the real component, thereby making it an indispensable tool for neutron scattering instrument installations.

SANS instrument at Necsa is being upgraded using curved neutron guides, variable collimation lengths, variable aperture diameters as well as long sample-to-detector distances (>10 m). The expected intensities at sample position will be presented according to the model. Recommendations of components and different configurations concluded from the model will be discussed. Some results obtained from such instruments will also be summarized.

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

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