Contribution ID: **227** Type: **Poster Presentation**

Beta-decay spectroscopy of neutron-rich nuclei

Tuesday, 8 July 2014 17:10 (1h 50m)

Abstract content
   (Max 300 words)
Formatting &
Special chars

The nucleus is a complex quantum-mechanical entity governed by the strong, weak, and electromagnetic forces acting between the constituent nucleons, which can be finally bound into various finite nuclear systems. The aim of nuclear-structure research is to obtain experimental information that can be confronted with results from theoretical models in order to improve our understanding of the atomic nucleus. In this project we intent to develop a tape station to be used at Flerov Laboratory of Nuclear Reactions at Joint Institute for Nuclear Research, Russia and at iThemba Laboratory For Accelerator Based Science, South Africa. The primary goal is to study the β-decay of nuclei in the vicinity of the closed neutron shells at N=82 and N=126 at iThemba LABS and FLNR-JINR, respectively. At iThemba LABS, neutron-rich nuclei will be produced via fission reactions while at FLNR-JINR transfer reactions will be used.

In these facilities, the neutron-rich reaction products will be separated using selective laser-ionization, accelerated to ˜ 50 keV and transported to a measuring station (tape station) where γ-rays from excited states populated by β-decay will be observed. The tape station will be used to reduce the background from the decay chain to stability, by using a tape to transport the unwanted activity away from the detectors. These measurements will give information vital to understanding the nuclear shell model and shell structure in the neutron-rich regions, possibly answering questions like: are magic numbers still valid in very neutron-rich nuclei far from the line of stability? Recently, theoretical work suggest that they are not. The planned facilities at iThemba LABS and FLNR-JINR will be described.

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

Yes

Level for award
 (Hons, MSc,
   PhD)?

PhD

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

Dr RA Bark, bark@tlabs.ac.za, iThemba LABS

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

no

Primary author: Mr MAKHATHINI, Lucky (iThemba LABS/Stellenbosch University)

Co-authors: Prof. ROHWER, Erich (Stellenbosch University); Prof. PAPKA, Paul (Stellenbosch University/iThemba LABS); Dr BARK, Rorbet (iThemba LABS)

Presenter: Mr MAKHATHINI, Lucky (iThemba LABS/Stellenbosch University)

Session Classification: Poster1

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