



Contribution ID: 183

Type: Oral Presentation

## High Energy Neutrons at the NRF-iThemba LABS

Wednesday, 5 July 2023 11:00 (20 minutes)

iThemba Laboratory for Accelerator Based Sciences (iThemba LABS) is a national facility of the National Research Foundation (NRF) in the Republic of South Africa. Activities at iThemba LABS are based around a number of sub-atomic particle accelerators located at the Cape Town and Johannesburg campuses. The largest of these, a K=200 separated sector cyclotron (SSC), accelerates protons to energies of 200 MeV, and heavier particles to much higher energies. These instruments and setups provide opportunities for modern research, advanced education and the production of unique radioisotopes [1]. The iThemba LABS neutron beam experimental facility is one of the few facilities available worldwide to provide quasi-monoenergetic neutron beams in the energy range, 30 MeV to 200 MeV [2]. Quasi-monoenergetic neutron beams in this range are produced in the neutron experimental vault via the  ${}^7\text{Li}(p,xn)$  or  ${}^{10}\text{Be}(p,xn)$  reactions [3] for varying thicknesses of Li and Be targets. Collimated fan beams are possible at neutron emission angles amongst others of  $0^\circ$  and  $16^\circ$ . These neutron beams at iThemba LABS have been well characterized [4,5]. The facility is currently designated by the National Metrology Institute of South Africa as an entity responsible for providing traceability for the medium and high-energy neutron measurements in South Africa. Thus, the facility is intended to support neutron physics research and metrology communities for calibrations of neutron detectors and radiation protection instruments. Cross-section measurements for neutron-induced reactions in the medium to high-energy region can also be performed.

For this contribution, we present some of the ongoing developments and future plans of the facility.

### References

- [1] Azaiez et al. (2020). Nuclear Physics News, 30:4
- [2] Pomp et al. (2014). Radiation Protection Dosimetry 161 (1-4) 62 – 66.
- [3] McMurray et al. (1993). Nuclear Instrum. and Methods in Phys. Res. A 329 217-222.
- [4] Nolte et al. (2002). Nuclear Instrum. and Methods in Phys. Res. A 476 369 – 373.
- [5] Mosconi et al. (2010). Radiat. Meas. 45 1342-1345.

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

No

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

N/A

**Primary author:** MALEKA, Peane (iThemba LABS)

**Co-author:** Dr NDABENI, Zina (University of Cape Town - NRF/iThemba LABS)

**Presenter:** MALEKA, Peane (iThemba LABS)

**Session Classification:** Nuclear, Particle and Radiation Physics

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