



DEPARTMENT OF ASTRONOMY

UNIVERSITY OF CAPE TOWN
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Neutron irradiation and damage assessment of plastic scintillators of the TILECAL section of the ATLAS detector.

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Following the comparative study of proton induced radiation damage on various plastic scintillator samples from the ATLAS-CERN detector, a study on neutron irradiation and damage assessment on the same type of samples will be conducted. The samples will be irradiated with different dose rates of neutrons produced in favourable nuclear reactions using a radiofrequency linear particle accelerator as well as the SAFARI nuclear reactor at NECSA and the IBR-2 pulsed reactor at the Joint Institute for Nuclear Research (JINR) in Dubna. The MCNP 5 code will be utilized in simulating the neutron transport for determining the dose rate. Light transmission and light yield tests will be performed in order to assess the radiation damage on the scintillators. In addition, Raman spectroscopy and Electron Paramagnetic Resonance (EPR) analysis will be used to characterize the samples after irradiation. The project aims to extend these studies to include radiation assessment damage of any component that processes the scintillating light and deteriorates the quantum efficiency of the Tilecal detector, namely, photomultiplier tubes, wavelength shifting optical fibres and readout electronics will also be exposed to neutron irradiation and the damage will be assessed in the same manner.

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

Yes

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

MSc

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

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