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TIGRESS segmented gamma-ray detector studies

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Abstract content
 (Max 300 words)

The TRIUMF-ISAC gamma-ray escape suppressed spectrometer (TIGRESS) is a relatively new (started full operation in 2009) state of the art gamma-ray detector array that was developed for the use at TRIUMF' Isotope Separator and Accelerator (ISAC) radioactive beam facility. The array comprises 16 32-fold segmented clover type HPGe detectors coupled with 20-fold Compton suppression shields and custom digital signal processing electronics. Each detector consists of four HPGe crystals (with approximately 40% relative efficiency) arranged in a clover-leaf geometry for optimal efficiency purposes. The inner contacts of the segments provide high resolution measurements of gamma-ray energy deposition for each crystal whilst the outer contacts give information about the locations of the gamma-ray interaction inside the detector. Accurate Doppler shift corrections are therefore possible based on the TIGRESS ability to locate gamma-ray interactions. Scintillators such as BGO and CsI(Tl) form part of the Compton suppression shield surrounding the semiconductor detectors. These scintillator detectors are used to suppress gamma-rays who do not deposit full energies to the HPGe detectors and hence Compton scatter to the scintillators. The Compton continuum is thus decreased significantly by this method. The recently purchased TIGRESS segmented detector at iThemba LABS will be used to develop techniques for maximising the use of this system for gamma spectroscopy experiments at iThemba LABS.

Apply to be
 consider for a student
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yes

Level for award
 (Hons, MSc,
 PhD)?

PhD

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

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Would you like to
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yes

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