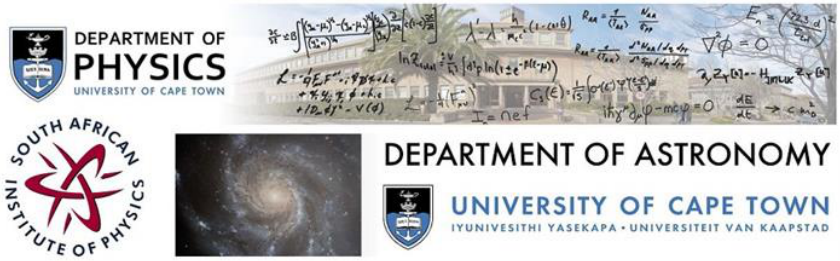

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The Spectroscopy of ¹⁶²Hf at Low and High Spins

Tuesday, 5 July 2016 16:10 (1h 50m)

Abstract content
   (Max 300 words)
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The main aim of this project is to comprehensively study the nuclear spectroscopy of ¹⁶² Hf at low and high spins and to search for triaxial superdeformed (TSD) structures.
The search for TSD structures in the rare earth region of the nuclear chart has been of interest recently. These structures have been predicted to occur for over 35 years. The main aim of this project is to look for the TSD bands in the ¹⁶²Hf nucleus. The research is also part of an investigation into the systematic behaviour of the N=90 nuclei. Our interest is in the systematics of the positive parity excited bands in N=90 nuclei and the behaviour of the negative parity bands as the proton number Z is increased leading to a reduction in the deformation of the ground state structure. A number of high spin structures with high dynamic moments of inertia have been observed in the heavy Hafnium isotopes. Cranked Nilsson Strutinsky calculations predict that such bands are most likely associated with TSD structures originating from a positive-γ energy minimum which dominates at ultrahigh spins.
Two experiments have been performed to study the nucleus of interest and they were carried out on world class multi-detector gamma-ray spectrometers namely the AFRODITE (South Africa) and JUROGAM at Jyvaskyla (Finland). The reaction used at JYFL was ¹¹⁰Pd(⁵⁶Fe, 4n) reaction at a beam energy of 270 MeV and the reaction used at iThemba LABS was ¹⁴⁴Sm (²²Ne, 4n) at a beam energy of 110 MeV. The collected data was sorted using MTSort . Results from both data sets will be presented.

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

yes

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

PhD

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

Prof. John Sharpey-Schafer
University of the Western Cape

Would you like to <br> submit a short paper <br> for the Conference
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