



Contribution ID: 118

Type: Oral Presentation

New Collective Structures in the $Z = 76$ Stable Odd Neutron Nucleus ^{187}Os .

The $K = 2⁺$ bands in the even-even Os isotopes lie at lower excitation energy than in any other nuclei in the Nuclear Chart. This makes them very interesting. In the odd isotopes the extra single neutron can couple to these $K = 2⁺$ structures giving information on the axial asymmetry in the shape of the core nucleus. In ^{187}Os there are two long lived isomers at low excitation energies enabling the coupling of different single-particle neutrons to the $K = 2⁺$ core excitation to be investigated. The ^{187}Os nucleus has not been extensively studied using &gamma-ray spectroscopy for over two decades, therefore the level scheme has not been well established. In the present study we performed a $^{186}\text{W}(^{4}\text{He}, 3n)^{187}\text{Os}$ reaction at a beam energy of 37.44 MeV to observe new excited states and thereby extend the known level scheme of ^{187}Os . The AFRODITE &gamma-ray spectrometer at iThemba LABS was used to detect the prompt &gamma-rays and the γ-γ coincidences. In this presentation the results on the extended level scheme of ^{187}Os and on the new rotational bands established will be discussed. Directional correlation (DCO) ratios and polarization asymmetries (A_{P}) are used to assign spins and parities of the states. The band structures will be discussed with reference to the Cranked Shell Model (CSM).

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

Yes

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

PhD

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Session Classification: Poster Session 1

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