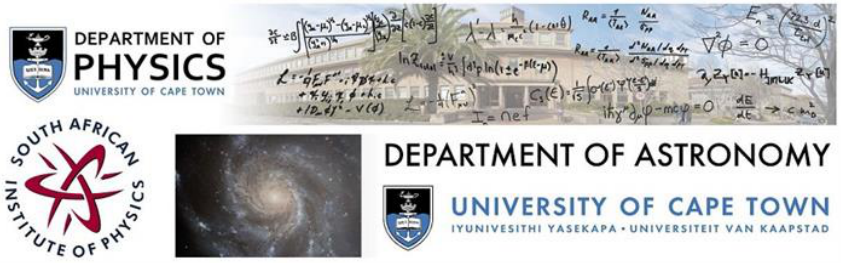

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spectroscopy of proton unbound states in 32Cl for nuclear structure and astrophysical studies.

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

Abstract content
   (Max 300 words)
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This project aims to investigate the Proton unbound states in 32Cl, within two aspects, the nuclear structure aspect and the astrophysical aspect.

For the nuclear structure aspect, 32Cl is a member of the A=32, T=2 isospin multiplet. This is the most precisely measured isospin multiplet. The masses of the members of an isobaric multiplet are related by a quadratic equation called the Isobaric Multiplet Mass Equation (IMME). This equation has proved to be quite successful in predicting the masses of the multiplet members. However, we aim to address recently observed unexpected break-down of the IMME for the A = 32, T = 2 quintet. We used the K600 magnetic spectrometer coupled with an array of HPGe clovers at iThemba labs to perform a high precision measurement to probe states around the T=2 state in 32Cl to look for potential sources of isospin admixtures that could cause the IMME breakdown.

For the astrophysical aspect we aim to study states near the Proton separation energy in 32Cl, which are relevant for nucleosynthesis in explosive hydrogen-burning stellar environments such as novae. We have used the K600 spectrometer together with a segmented silicon detector array at backward angles and an array of HPGe clovers. Proton and gamma-ray information obtained in coincidence with the triton events at the focal plane will be used to obtain branching ratio information relevant for the 31S(p,γ)32Cl reaction rate.

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Smarajit Triambak
striambak@uwc.ac.za
university of western cape

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Primary author: Mr KAMIL, mohamed (university of western cape)

Presenter: Mr KAMIL, mohamed (university of western cape)

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