Contribution ID: **80** Type: **not specified**

ASTROBOX: New detection for very low-energy protons spectra from β-delayed proton decay

Wednesday, 3 July 2013 12:50 (20 minutes)

AstroBox, was developed to perform low energy proton spectroscopy from β-delayed proton emitters of interest to astrophysics studies: Energetic precursor nuclei are identified and stopped in the gas volume of the detector. The subsequent β or β-proton decay trace ionized paths in the gas. The ionization electrons are drifted in an electric field and are amplified by employing a Micro Pattern Gas Amplifier Detector, MPGAD. The system was tested in-beam using the β-delayed proton-emitter 23Al separated with the Momentum Achromat Recoil Spectrometer (MARS). Off-beam proton spectra have essentially no β background down to ˜150 keV and have a resolution of ˜15 keV (fwhm) for proton-decay lines at Ep=206 and 267 keV. Lines with βp-branching as low as 0.02% are observed. The device also gives good mass and charge resolution for energetic heavy ions measured in-beam. Results from the test experiment will be given.

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Session Classification: Wednesday (MPGD mid-morning session)