ICRC

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HARPO, TPC as a gamma telescope and polarimeter: First measurement in a polarised photon beam between 1.7 and 74 MeV

Tuesday 4 August 2015 16:00 (1 hour)

Gamma-ray astronomy allows us to explore the non-thermal emissions and magnetic field configuration of objects such as Active Galactic Nuclei (AGN), Gamma Ray Bursts (GRB) and pulsars.
Presently, there is a sensitivity gap for gamma rays between 1 MeV and 100 MeV.
Additionally, there is no polarisation measurement above 1 MeV, although such a measurement could shed light on emission processes.
A gaseous detector can achieve a much better angular resolution in the MeV-GeV range than the current/past telescopes that use tungsten converters, thanks to the reduced multiple scattering of the electrons and positrons from conversion.
This translates to a greatly improved point source sensitivity and also gives access to the linear polarisation of the photons through the azimuthal angle of the electron-positron pair.

The HARPO Time Projection Chamber (TPC) has been designed as a high angular resolution telescope for gamma-ray polarimetry.
It was set up in a polarised gamma-ray beam at the NewSUBARU accelerator in Japan in November 2014.
Data were taken at different photon energies from 1.7 MeV to 74 MeV, and with different polarisation configurations.
The full experimental setup of the TPC and the photon beam will be described.
The first results from the beam campaign will be shown.
The future projects toward a space telescope will be discussed.

Collaboration

– not specified –

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