

- Laboratory/ research team :

LLR, Ecole Polytechnique & CNRS/IN2P3. γ -astronomy group, HARPO project.

- Title :

High-performance γ astronomy and polarimetry in the MeV-GeV energy range and polarimetry.

Study of the performances of a flight module. AGN polarimetry.

- Overview of the research :

We are developing a new detector concept for high-resolution and high-sensitivity γ -ray astronomy in the pair-creation regime [NIM A 701 (2013) 225, NIM A 729 (2013) 765]. We have built a time projection chamber (TPC) demonstrator that is ready [SPIE2014, arXiv:1406.4830] for beam tests (NewSUBARU Japan, Nov. 2014).

The Ph. D. student will contribute to the analysis of these data and to their publication, in particular, the first measurement of the photon pair conversion polarisation asymmetry at low energy (2 – 76 MeV) where the cosmic-source signal has most of its statistics. He/she will then participate in the design of a flight model, in particular he/she will conceive, simulate and optimize a trigger system based on the real-time multiplicity signal provided by the AGET chip developed and recently validated at CEA. Finally, the performance of such a telescope for astrophysical observations will be evaluated, in particular for the study of gamma-ray blazars such as W Comae and 3C 66A. By measuring their polarisation, it should be possible to determine whether their emission is due predominantly to leptonic or to hadronic processes [Astrophys.J. 774, 18 (2013)], a long-standing question in blazar astrophysics.

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