



Contribution ID: 33

Type: Poster

## Correction for pile-up in the photon counting measurements of the Mini-EUSO experiment onboard the ISS

Thursday 15 May 2025 22:10 (2 minutes)

The Mini-EUSO mission operates from inside the International Space Station (ISS) to detect UV photons produced by ultra-high-energy cosmic rays (UHECRs), ELVES, meteors or other transient atmospheric or ground phenomena, using multi-anode photomultiplier tubes (MAPMTs) in single photoelectron counting mode. Because of the  $\sim 6$  ns extended dead time (EDT) associated with the use of the SPACIROC-3 ASIC, the measured counting rates underestimate the actual incoming photon flux in the case of high-intensity signal. Using the results of a detailed numerical and experimental study of the pile-up statistics presented in an accompanying communication, we demonstrate: i) how the (corrected) rate of photons hitting a given pixel of the camera as well as its uncertainty can be derived from the recorded counts, provided that the so-called double pulse resolution of that pixel is known, and ii) how the latter can be derived directly from the data themselves, on a pixel-by-pixel basis, using the histograms of the photon counts recorded over a sufficient large period of time. The procedure, using machine learning for the systematic treatment, is applied to the 2304 pixels of the Mini-EUSO camera

### Eligibility for "Best presentation for young researcher" or "Best poster for young researcher" prize

No

**Authors:** M'SIHID, Enzo (APC —Laboratory Astroparticle & Cosmology); Mr PARIZOT, Etienne (Université Paris Cité / APC)

**Co-author:** FOR THE JEM-EUSO COLLABORATION

**Presenter:** M'SIHID, Enzo (APC —Laboratory Astroparticle & Cosmology)

**Session Classification:** Posters