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## Exploring the Potential of a $2\pi$ Field-of-View Gamma-Ray Detector for GRB Observations in Space

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Assessing the performance of a gamma-ray detector in the GeV energy range with an effective  $2\pi$  field of view (FoV) in space is relevant for the design of future missions aimed at the study of the high energy emission of transient events. Such a design offers a significant advantage for detecting short-duration gamma-ray bursts (GRBs), which can be as short as only a fraction of a second. Traditional detectors with narrower FoVs may miss many of these events if their initial pointing is not ideal.

In this presentation, we explore the expected capabilities of a generic  $2\pi$  FoV gamma-ray detector in orbit, using simulations to evaluate its potential for GRB detection. As a case study, we apply this framework to the High Energy cosmic Radiation Detection (HERD) facility, a future cosmic-ray and gamma-ray detector planned for installation aboard the China Space Station. By comparing its expected performance on GRB models from the Fermi-LAT's Second Gamma-ray Burst Catalog, we assess the feasibility and scientific impact of such a wide-FoV instrument.

While the final design of HERD may differ from the one considered in this study, the results presented here remain broadly relevant to the development and optimization of future space-based gamma-ray detectors with wide FoVs.

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

Yes

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