

Z124a INSPIRE: MeV Gamma-Ray Detector on a 50-kg Class Satellite

Kazuo S. Tanaka, R. Mori, T. Suga, S. Ogasawara, K. Yamamoto, J. Kataoka (Waseda University), Y. Yatsu, T. Chujo, K. Watanabe, H. Kobayashi, Y. Amaki, K. Takahashi, M. Yasuda, D. Kobayashi, K. Otsubo, Y. Arai, Y. Ozeki, K. Tashiro, S. Hayatsu, Y. Kawaguchi, H. Yoshida, M. Fukuda, H. Seki, S. Joshima, D. Yoshimura, K. Miyamoto, H. Nakanishi (Tokyo Tech), M. Onishi, S. Takeda (iMAGINE-X) and INSPIRE team

In the MeV gamma-ray range, there are various radiation processes and that are important observational targets as probes for nucleosynthesis in the universe. However, only about 30 steady celestial objects were discovered by COMPTEL, launched in 1991. Since then, no observations have surpassed the detection sensitivity of COMPTEL.

In this situation, we are developing a small satellite equipped with the Hybrid Compton Camera (HCC) operating as Compton cameras for the gamma-ray region and pinhole cameras for the X-ray region in the 30 keV-3 MeV range. The detector units, including scatterers and absorbers, are composed of pixelated GAGG scintillators and two-dimensional MPPC arrays. The development aims to achieve a detection sensitivity exceeding that of COMPTEL, performing a scan of the galactic plane to elucidate the mechanisms of nucleosynthesis in the universe, with a target launch in fiscal year 2027.

This presentation will introduce the design of the detector and DAQ, progress in the development of the EM model, and performance evaluations such as sensitivity and angular resolution through simulations.