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Status of AMEGO-X, the All-sky Medium Energy Gamma-Ray Observatory eXplorer

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MeV gamma-ray observations are important to deepen our understanding of the physics of high energy phenomena such as active galactic nuclei and gamma-ray bursts. Particularly an all-sky MeV gamma-ray facility with a good localization accuracy of about 1 degree can significantly increase the number of follow-up observations of transient events, increasing opportunities for multi-messenger astronomy. Therefore, we propose the AMEGO-X project (PI: R. Caputo (GSFC/NASA)) as a future all-sky MeV gamma-ray satellite. Its gamma-ray detector has an order of magnitude better sensitivity than previous telescopes in the energy range 100 keV to 1 GeV with the localization accuracy of 1 degree (90% C.L. radius) for transient sources. Although our proposal for AMEGO-X was not selected for the 2021 NASA MIDEX Announcement of Opportunity, we have kept working to enhance the feasibility of the project for the next opportunity. We have made significant progress on the development and evaluation of a novel silicon pixel detector, AstroPix, which serves as the primary sensor for AMEGO-X. We plan to test AstroPix in space environment using a sounding rocket scheduled for 2026. In addition, the prototype detector of AMEGO-X called ComPair-2, consisting of a 10-layer AstroPix silicon tracker and a CsI calorimeter array, was selected as a NASA APRA funded project (PI: R. Caputo). We commenced the development of the ComPair-2 detector system with a new composite structure design and initial tests of the first prototype tracker layer is under way. In this contribution, we report on the AMEGO-X project, its scientific objectives, the development status of both AstroPix and ComPair-2, and future prospects.

Collaboration(s)

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