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RESCEU コロキウム

東京大学大学院理学系研究科　附属ビッグバン宇宙国際研究センター

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場　所：オンライン（Zoom）

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Dawn of MeV gamma-ray astronomy with electron-tracking Compton camera

Abstract

MeV gamma-ray from universe is an unique window for direct observation of nucleosynthesis. From the early days of high-energy astrophysics, the line gamma-rays from radioisotopes, electron-positron annihilation line, and de-excitation line are expected to become probes for the nucleosynthesis in supernovae, diffusion of matter in galaxy, and existence of low-energy cosmic-rays. However, there is a little progress in the observation after COMPTEL. For open the window of MeV gamma-ray astronomy, we are developing an electron-tracking Compton camera (ETCC), which is consist of a gaseous electron tracker as a Compton-scattering target and the surrounding scintillators as the absorber for the scattered gamma ray. In 2018, we performed one-day balloon flight (SMILE-2+) for demonstrating the observation of celestial objects and succeeded to detect Crab nebula and Galactic center region with the significance of 4 sigmas and ~10 sigmas, respectively. In addition, the event rate and spectrum at the level flight were explained by the summing of extragalactic diffuse, atmospheric gamma-rays, and instrumental gamma-rays. This fact says that our ETCC can realize the low-noise observation under the space condition, and it is the first designable telescope having a wide field of view in MeV band. In this talk, we will present the results of SMILE-2+ and the future observation plans using long-duration balloons or satellites.

興味をお持ちの方の聴講を歓迎致します。