ICEHAP Seminar

Oct. 21, Wednesday, 2pm, 2015

place: Fac. of Sci. Bldg 2, 3F, room No.308

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(Cosmic-Ray Group, Kyoto Univ)

"An Electron-Tracking Compton Telescope for a Survey of the Deep Universe by MeV gamma-rays"

Abstract

Photon imaging for MeV gammas has serious difficulties due to huge backgrounds and unclearness in images, which are originated from incompleteness in determining the physical parameters of Compton scattering in detection, e.g., lack of the directional information of the recoil electrons.

Here we report the performance of an Electron-Tracking Compton Camera (ETCC), and prove that it has a good potential to break through this stagnation in MeV gamma-ray astronomy. The ETCC provides all the parameters of Compton-scattering by measuring 3-D recoil electron tracks;

The energy loss rate (dE/dx), which CCs cannot measure, is also obtained, and is found to be indeed helpful to reduce the background under conditions similar to space. Accordingly the significance in gamma detection is improved severalfold.

We demonstrate the possibility of ETCC reaching the sensitivity below 1 × 10^−12 erg cm^−2 s^−1 at 1 MeV In addition, I present the balloon observation project with an ETCC (SMILE project) for the certification of above abilities and going ahead MeV gamma-ray astronomy.