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2. Improvement of sensitivity for MeV Gamma ray Telescope using Time Projection Chamber technology

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The observation of gamma rays in the MeV energy band is crucial to astronomical research. There are fantastic scientific opportunities on dark matter detection, cosmic ray physics and gamma-ray astronomy via MeV gamma ray observations. MeV Gamma ray Telescope (MeGaT) is a new generation of high-resolution space MeV gamma ray detection telescopes by using Time Projection Chamber (TPC) technology surrounded by CdZnTe. Sensitivity is an important parameter of the telescope, which is related to angular resolution, effective area and the flux of backgrounds. The angular resolution includes the Angular Resolution Measure (ARM), Scatter Plane Deviation (SPD) and Point Spread Function (PSF). Thanks to the precise measurement of the direction of Compton recoil electron by TPC and Micromegas, the angular resolution of incident primary gamma and the sensitivity of MeGaT are improved.

In this report, we will introduce the definitions of three kinds of angular resolutions, the calculation method of sensitivity, and how MeGaT can accurately measure the scattering direction of electrons to improve the sensitivity of the telescope in the MeV energy band.

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