



Contribution ID: 156

Type: poster

Improvement of GAMMA-400 physical scheme for precision gamma-ray emission investigations

Tuesday, 6 September 2016 16:30 (1h 45m)

The main goal for the GAMMA-400 gamma-ray telescope mission is to perform a sensitive search for signatures of dark matter particles in high-energy gamma-ray emission. Measurements will also concern the following scientific goals: detailed study of the galactic center region, investigation of point and extended gamma-ray sources, studies of the energy spectra of Galactic and extragalactic diffuse emissions. To perform these measurements the GAMMA-400 gamma-ray telescope possesses unique physical characteristics for energy range from 20 MeV to ~200 GeV in comparison with previous and current space and ground-based experiments. The major advantage of the GAMMA-400 instrument is excellent angular and energy resolution for gamma-rays above 10 GeV. The gamma-ray telescope angular and energy resolutions for the main aperture at 100-GeV gamma rays are $\sim 0.02^\circ$ and $\sim 2\%$, respectively.

The special goal is to improve physical characteristics in the low-energy range from 20 MeV to 100 MeV. Minimizing the amount of dead matter in the telescope aperture allows to obtain the angular and energy resolutions better in this range than in current space missions. The gamma-ray telescope angular resolution at 50-MeV gamma rays is better than 5° and energy resolution is $\sim 10\%$. We report the method providing these results.

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Session Classification: Poster