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Cosmophysical research with GAMMA-400

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The development of the GAMMA-400 gamma-ray telescope for cosmophysical research continues under the Russian Federal Space Program. The GAMMA-400 experiment will be implemented aboard the Russian astrophysical space observatory, which will be operating in a highly elliptic orbit during 7 years to provide new data on gamma-ray emission and cosmic-ray electron + positron fluxes mainly from the Galactic plane, Galactic Center, and the Sun. The main mode of observations will be the continuous point-source mode with duration of up to ~100 days. The GAMMA-400 gamma-ray telescope will study high-energy gamma-ray emission up to several TeV and cosmic-ray electrons + positrons up to 20 TeV. GAMMA-400 will have the never-achieved angular resolution, the high energy and time resolutions, as well as very good separation efficiency of gamma rays from cosmic-ray background and electrons + positrons from protons. The distinctive feature of GAMMA-400 is the wonderful angular resolution for energies >30 GeV ($\sim 0.01^\circ$ for $E_\gamma = 100$ GeV) that exceeds resolutions of the space-based and ground-based gamma-ray telescopes by a factor of 5-10. GAMMA-400 studies can reveal gamma-ray emission from annihilation or decay of dark matter particles, identify many unassociated discrete sources, explore the structure of extended sources, improve the data on cosmic-ray electron + positron spectra for energies >30 GeV.

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