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Development of optical systems for the KLYPVE experiment

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KLYPVE is an orbital detector of ultra high energy cosmic rays to be deployed on the Russian Segment of the International Space Station. An important part of the detector, which determines its physical parameters (energy threshold, field of view) is an optical system. For the project, a two-component system composed from a large area mirror-concentrator and a correcting Fresnel lens was developed. Two options were considered: a "Baseline" and a "Multi-eye telescope system" (METS). The first one consists of a 3.4 m diameter mirror and a 1.7 m lens and has $\pm 14^\circ$ FOV. The second one consists of three identical telescopes with $\pm 10^\circ$ FOV (a mirror of 2.4 m diameter and a 1.2 m lens) and can operate in various modes. The production of a mold for the central segment of the mirror was done in SINP MSU. This mold will be used for a carbon-plastic mirror manufacture. It is an important step in the development of lightweight and space qualified optical systems with high performance parameters production technology. A detailed description of the developed optical systems, optimization studies and simulations are presented as well as results of the mirror mold production and tests.

Collaboration

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Author: Dr SHARAKIN, Sergey (SINP MSU)**Co-authors:** SAKAKI, Naoto (Aoyama Gakuin University); KLIMOV, Pavel (Lomonosov Moscow State University); BIKTEMEROVA, Svetlana (JINR); Dr TAKIZAWA, Yoshiyuki (RIKEN)**Presenter:** Dr SHARAKIN, Sergey (SINP MSU)**Session Classification:** Poster 2 CR**Track Classification:** CR-IN