Lobster - eye X-ray optics

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Annotation
The imaging X-ray telescopes in current use mostly have limited field of view. The alternative X-ray optics geometries achieving very large fields of view have been theoretically suggested in the 70ies but have been not constructed and used so far. We review the design and basic properties of the wide-field X-ray optical systems based on one- and two-dimensional lobster-eye geometry and suggest technologies for their development and construction. First results of the development of replicated X-ray reflecting cells for use in two-dimensional X-ray optics of Angel lobster eye type are presented and discussed.

The main goal of the project reported here is the feasibility study and the development of the wide field X-ray optics of the Lobster-Eye type as well as related optical and X-ray test methodology. We proposed to develop and manufacture the Wide-Field Lobster-Eye X-ray Optic by mean of a special electroforming and replication process.

The X-ray mirror of this type (Angel type) consist of a large number square channels aligned on the surface of the sphere. The inner surface of optically precise channels should feature extremely high surface quality and smoothness. The program involves also the development of new special test methods. The scientific goal is the ability of wide field X-ray imaging of the sky with the aim to study and to understand short-lived and burst astrophysical phenomena such like X and gamma ray transients, novae and other bursting processes.

The project is expected to contribute to the collaboration between the Czech republic and the European Space Agency ESA and NASA (USA).

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