

Development of a miniaturized X-ray imager for GEOspace X-ray imager (GEO-X)

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A reduction in weight of instrument, especially optics, is a key technique for explorers or small satellite missions. GEO-X (GEOspace X-ray imager) is a Japanese small satellite mission for X-ray observations of the dayside boundaries of the Earth's magnetosphere. An instrument is composed of a X-ray telescope and a radio hard semiconductor pixel detector. Conventional X-ray optics have a trend that optics with better angular resolution have larger ratio of the weight to effective area. Therefore, it is difficult to utilize them for the X-ray planetary mission which has a severe weight limit. Micro pore optics are being developed based on a concept of a miniature optics. An original micro pore optics based on Si micromachining technologies will be used. A CMOS image sensor and a DEPFET (DEPLETED P-Channel FET) are candidates for the X-ray detector. These new type semiconductor detectors are radiation hard and have optical light resistance, which are crucial in GEO-X to observe magnetosheaths and cusps near the dayside of the Earth. We report a summary of the instrument design and development for GEO-X.

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