**X-ray and γ-ray PolariS PolariS Satellite**

Polaris Working Group


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Polaris (PolariS Polarisatellite) is a Japanese small satellite mission dedicated to the polarimetry of X-ray and γ-ray sources. The aim of the mission is to perform hard X-ray (10–80 keV) polarimetry of sources brighter than 10 mCrab, employing three X-ray super mirrors and imaging polarimeters. The X-ray polarimeter enables us to measure unresolved structure of the universe, for example, magnetic field in the super nova remnants, geometry of accretion disk around a black hole. Energy dependence of the polarizer degree and direction is essential to interpret such unresolved structures. The second purpose of the mission is to measure GRB polarization with wide field instruments, as was done with IKAROS/GAP. Polaris GRB polarimeters aim to detect 10 GRBs/year. The satellite design follows the guideline of the JAXA small satellite series, for which common bus system will be employed. Target launch date is in the latter half of 2010's.

### Energy Dependence of the Polarization is the key.

Hard X-ray band, where Non-Thermal Emission is dominant is important.

### Expected Sensitivity (Minimum Detectable Polarization)

Minimum detectable polarization (MDP) is the polarization degree of the target for which significant detection will be made for given source intensity and observation time. The MDP is determined by the M (modulation factor), (efficiency), and background of the polarimeter.

#### Single Hit

**Source** | **Energy (keV)** | **MDP** | **Detection Efficiency** | **Background**
---|---|---|---|---
Grb | 20-30 | 0.01% | 0.01% | 0.01%

#### Double Hit

**Source** | **Energy (keV)** | **MDP** | **Detection Efficiency** | **Background**
---|---|---|---|---
Grb | 20-30 | 0.01% | 0.01% | 0.01%

**Double Hit in SIP can enable detection of the incident position and scattering direction simultaneously. PolariS of diffuse sources is possible and background is reduced in this mode. On the other hand, in the Single Hit Mode, only polarimetry of point sources is possible.**

### References