SO/PHI data request form
(first science orbit; SO/PHI-Team internal version)

Title
Solar Polar Faculae

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Science case (stay on one slide):
please also state, why is PHI needed; why is the science unique?

- The topic of this proposal are Polar Faculae. Polar Faculae (PFe) are bright small scale magnetic features with kilo-Gauss fields found around the solar poles. Together with bright points are the clearest proxy of magnetic flux tubes, and contribute to global irradiance and magnetic field. PFe present an activity cycle in anti-phase with sunspots, i.e. appearing in higher numbers and at lower latitudes when the solar magnetic field is in poloidal configuration. Thus, PFe are key elements and tracers of the polar and global fields.

- The aim of the work is to study the magnetic field and topology of PFe from two vantage points simultaneously. PHI can provide very high resolution data and combine it with near-Earth observatories, revealing PFe minute structure and tube configurations and helping to constrain projection models. Moreover, following the solar rotation, PHI can observe the structures for longer periods of time and with more direct line of sight. Studying PFe magnetic field vector this way will grant new information into their distribution, characteristics, and contribution to the polar and global fields. The study of PFe evolution will also contribute to the polar dynamics understanding. And combined with EUI and SPICE, it will supply simultaneous observations at different heights for long time periods, providing evolution analyses of the PFe magnetic footpoints and their relation to the higher layer phenomena, giving support to studies of structure development from surface to outer solar layers.

- PFe observations at both maximum and minimum latitudes with polar pointing and coordinated observations with Earth of I_c + vector B are asked, together with raw data when possible. To be performed at particular windows: i) short series of 1-2 minutes cadence for short evolution; ii) series of few hours observations with 30-60 min cadence for mid-long evolution. FDT observations can provide larger context and statistics at lower resolution (possible PD enhancement of raw data) while still observed from two LOS.

Requirements/data (use additional slide if needed)

- Type of solar feature: **Polar Faculae**

- HRT or FDT: **mainly HRT, some context FDT**

- Physical parameters needed (available: B_LOS, vector B, v_LOS, I_c, raw data): **raw data; I_c + vector B**

- Total length of observation: **at specific windows: i) 60 min; ii) 24 hours**

- Cadence (maximum 1 dataset/min): **for the above specific windows: i) 1 min, maximum of 2 min between datasets; ii) 30 min, maximum of 60 min**

- Pointing needs (disc centre, limb, : **Poles**

- Orbit needs (spatial resolution/co-rotation/angle to Earth/angle to other spacecraft): **high latitudes**

- Total number of datasets: **minimum of i) 30-60 datasets, ii) 24-48 datasets**

- Full frame 2k x 2k or partial frame 1kx1k, 0.5kx0.5: **Full frame (in HRT), full disc FDT**

- Full resolution or 2x2, 4x4 binned data: **Full resolution**

- noise level (default 10^{-3}): **default**

- Co-observations with other instruments: **Hinode, ground based (e.g. SST)**

- Special requests: **program to be performed especially at maximum/minimum latitude windows**