SO/PHI data request form

(Cruise phase + first science orbit; SO/PHI-Team internal version)

Understanding solar UV variability using SO/PHI in combination with Aditya/SUIT

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MPS

Science case (stay on one slide):

Please also state, why is PHI needed; why is the science unique?

- Variability of the solar UV (200-400 nm) irradiance is critical for understanding solar influence on climate but is poorly constrained:
  - in UV irradiance measurements due to insufficient stability of the instruments;
  - in irradiance models due to uncertainties in the facular Contrast(B, λ, μ).
- Facular Contrast(B, λ, μ):
  - Observations: difficult, single λ and μ, B is usually not available;
  - Models: mostly 1D (poor closer to the limb) with no direct link to B; 3D models start appearing (observational validation needed).
- Aditya-L1/SUIT: will provide full disc images in 3 broad-band filters between 200 and 400 nm and a number of narrow ones (e.g. Ca II, Mg II) with the resolution of 1.4".
- SUIT will give Contrast(λ, μ). SDO/HMI can provide B/μ (thus high uncertainty closer to the limb). By observing regions, that are close to limb in SUIT images, at the disc centre (or close to it) SO/PHI can provide B directly without foreshortening, which is unique.

Requirements/data

Besides best guess requirements, you may also list minimum requirements on the data

- Type of solar feature: faculae/network/QS
- HRT or FDT: Ideally HRT. As a minimum requirement: at perihelion, FDT would do as well; further away – HRT
- Physical parameters needed (available: B_LOS, vector B, v_LOS, I_c, raw data): B_LOS, I_c
- Total length of observation: 5-10 minutes every few days throughout the whole window (minimum: 5 min on 5 days during SW and PW)
- Cadence (maximum 1 dataset/min): 1 dataset/min
- Pointing needs (disc centre, limb, active region location, particular μ): SW+PW: around disc center, NW: westward of disc centre (has to see parts of the Sun that would be seen by SUIT from L1 close to limb)
- Orbit needs (spatial resolution/co-rotation/angle to Earth/angle to other spacecraft): SW + PW more important
- Total number of datasets: ~ 1 set/min x (5-10 min/day) x (5-10 days) ≈ 25 – 100 sets
- Full frame 2k x 2k or partial frame 1kx1k, 0.5kx0.5: full frame
- Full resolution or 2x2, 4x4 binned data: full
- noise level (default 10^{-3}): default
- Co-observations with other instruments: Aditya-L1/SUIT (also SDO/HMI but this should be available)
- Special requests: see pointing needs