

# SO/PHI data request form

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

**EUV-dark CH-like structures adjacent to an active region**

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# Science case (stay on one slide):

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

Equatorial CHs are often associated with decaying ARs. Therefore, we want to study EUV-dark areas CH-like structures adjacent to an AR in detail to determine their nature.

PHI observations will yield information on the strength and unipolarity of the underlying magnetic flux. The sensitivity and stability of PHI allow recording an uninterrupted time series over a longer period and co-observations with high-resolution EUV observations are crucial to understand the coupling of photospheric magnetic fields and the corona, in particular concerning small coronal structures. SPICE will provide information on the initial acceleration of the wind.

Additionally, co-observations with AIA on SDO would provide further information on how the properties of these areas, e.g. darkness and size, depend on temperature.

The evolution of the magnetic flux in these EUV-dark areas CH-like structures adjacent to an AR should be followed over a timescale comparable to the lifetime of a supergranule. This implies an observing sequence of about one day, at moderate cadence. To investigate the often rapid changes of their boundaries due to impact of flux emergence and cancellation and to transient activity one should also include a shorter stretch of data at high cadence of about one minute to capture this process.

Finally, the obtained data can also be used to extrapolate the magnetic field, determining if locally the field is open or closed and how far it is dominated by the adjacent AR. If a regular coronal hole is available, either at low latitudes or near the poles, these data can be compared to the well-studied regular CHs, but through the same instrumentation as EUV-dark CH-like structures adjacent to an AR.

# Requirements/data (use additional slide if needed)

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

- Type of solar feature: EUV-dark CH-like structures adjacent to an AR
- HRT or FDT: HRT
- Physical parameters needed (available: B\_LOS, vector B, v\_LOS, I\_c, raw data): B\_LOS, Inclination
- Total length of observation: 10 min – 1h (1 min cadence), 1 day (30 min cadence), 6h (10 min cadence)
- Cadence (maximum 1 dataset/min): 1 min for 10 min – 1h, 30 min for 1 day, 10 min for 6h
- Pointing needs (disc centre, limb, active region location, particular  $\mu$ ): near AR
- Orbit needs (spatial resolution/co-rotation/angle to Earth/angle to other spacecraft): Co-observations with AIA on SDO would be useful to see how the properties (darkness, size, etc.) of these areas depend on temperature; spatial resolution: 116km/pixel @ 0.32AU
- Total number of datasets: > 90
- Full frame 2k x 2k or partial frame 1kx1k, 0.5kx0.5: full frame
- Full resolution or 2x2, 4x4 binned data: full resolution
- noise level (default  $10^{-3}$ ): default
- Co-observations with other instruments: EUV, SPICE, AIA
- Special requests: