SO/PHI Data Request Form

Magnetic Nature of Campfires Seen in EUI/HRI

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

Quiet-Sun observations with SO/EUI/HRI have recently uncovered the ubiquitous presence of small-scale brightenings (campfires) that are typically of few Mm2 in size and last only for few tens of seconds. In addition to that, uni and bi-directional plasma jets have also been identified using the high cadence EUI observations. It is conjectured that the mechanism that drives these brightenings is possibly the small-scale magnetic reconnection. Given the spatial extents of these bright features, SO/PHI HRT observations are best suitable for an investigation of the underlying field at this high spatial resolution. We propose to provide SO/PHI HRT time series of a quiet-Sun region at disc center at maximum cadence recorded co-spatially and co-temporally with EUI HRI time series. Apart from a quiet-Sun region, it would also be interesting to investigate a more active patch such a moss region and compare the field configurations. This would facilitate us towards a better understanding of the physical conditions that lead to a reconnection event.

The PHI B_LOS maps in the first place will allow us to distinguish between scenarios such as emergence or cancellation, wherein magnetic field extrapolations will help us understand the different field configuration types such as forking vs crossing, and to compare with theoretical models of these small-scale transient events.

Such required time series are best recorded around perihelion, at highest spatial resolution. However, there are also advantages in recording a set of observations at inferior conjunction with Earth during the first orbit. The spatial resolution will be only roughly half as high, but it will allow making additional use of Earth-orbiting resources, in particular IRIS, but also AIA and partly Hinode. Observations at intermediate angles between these two extremes will allow determining the heights of the campfires when combining EUI and AIA observations. This will be of considerable value when applying extrapolation techniques to the observed magnetic maps in order to get the magnetic structure at the height of the campfires.

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

Type of Solar Feature: Quiet Sun, Active region moss

HRT or FDT: HRT

Physical parameters needed (available: B_LOS, vector B, v_LOS, I_c, raw data): raw data, B_Los

Total length of observation: 1 hour

Cadence (maximum 1 dataset/min): 1 min

Pointing needs (disc centre, limb, active region location, particular μ): disc center

Orbit needs (spatial resolution/co-rotation/angle to Earth/angle to other spacecraft): perihelion, Inferior Earth conjunction

Total number of datasets: 60 datasets

Full frame 2k x 2k or partial frame 1kx1k, 0.5kx0.5: 2k x 2k

Full resolution or 2x2, 4x4 binned data: full

noise level (default 10-3): default

Co-observations with other instruments: EUI/EUV HRI and EUI/ Lya HRI and SPICE, AIA, IRIS

Special requests: none