SO/PHI data request form

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

Constraining mode conversion with stereo observations

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Science case (stay on one slide):

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

- Helioseismic waves are perturbed non-linearly by strong surface magnetic fields such as sunspots. This makes it challenging to infer the subsurface structure of sunspots and active regions.
- It has been suggested that sound waves are converted to magneto-acoustic waves in strong magnetic fields. These waves should be observed as a slow acoustic wave propagating along the direction of the magnetic field, and Alfvenic oscillations of the magnetic field itself.
- So far, it has only been possible to measure the line-of-sight velocity and the magnetic vector field from one direction to test this. Combining SO/PHI observations with SDO will give us the unique and essential “stereo” observations of the velocity vector and magnetic field vector to unambiguously observe these oscillations.
- Fully constraining perturbations to the helioseismic waves, may make it possible to better infer the subsurface structure of sunspots using helioseismology.

Requirements/data (use additional slide if needed)

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

- Type of solar feature: active region / sunspot
- HRT or FDT: HRT
- Physical parameters needed (available: B_LOS, vector B, v_LOS, I_c, raw data): vector B, v_LOS, I_c
- Total length of observation: 6 hours < t < 24 hours
- Cadence (maximum 1 dataset/min): 60 seconds (vector B could be 1/hour)
- Pointing needs (disc centre, limb, active region location, particular μ): active region location
- Orbit needs (spatial resolution/co-rotation/angle to Earth/angle to other spacecraft): angle to Earth, but common observation with SDO e.g. 20-50 degrees
- Total number of datasets: t/dt (1440 would be nice)
- Full frame 2k x 2k or partial frame 1kx1k, 0.5kx0.5: full frame
- Full resolution or 2x2, 4x4 binned data: 2x2 bin (resolution ~HMI could be fine if TM is low)
- noise level (default 10^{-3}): N/A
- Co-observations with other instruments: SDO
- Special requests: Potentially also interesting with full-disk observations if there is a big sunspot