

**Timestamp:** 7/19/2016 14:03:08

**Title of Proposed Observation:**

SST-IRIS-Hinode Campaign

**Main Objective:**

The goal is to obtain very high cadence, high spatial resolution observations of the photosphere & chromosphere with SST to accompany the IRIS and Hinode spectra and images to study chromospheric heating in ARs and quiet sun and the origin of RBEs/RREs/jets in quiet sun.

**Scientific Justification:**

Coordinated observing campaign using the Swedish Solar Telescope on La Palma, IRIS and Hinode is scheduled for September 23 - October 6, 2016. Observers at the SST will be from LMSAL for this entire period. The goal is to obtain very high cadence, high spatial resolution observations of the photosphere & chromosphere with CRISP to accompany the IRIS spectra and images of the chromosphere and transition region. CRISP data will allow measurement of line profiles for Doppler shifts and polarization for some magnetic field information above the photosphere. The new blue/UV imaging system CHROMIS may be available in addition to CRISP: it is being installed in August. Hinode will contribute precise photospheric fields with SOT/SP, and coronal images and spectra with XRT and EIS.

The main science goals this year are as follows. Another goal may be added, depending on the success of previous SST during the summer.

**A. Chromospheric Heating**

**Aim:** IRIS heating diagnostics supported by SST polarimetry and chromospheric context

**Targets:**

a. AR mossy plage (moss): highest target priority is quiescent plage, i.e. without strong

flux emergence. This is preferably found in old (decaying) active regions. Moss can be recognized by AIA 94A emission - the roots of hot loops. Preferably close to disk center.

(with moss, AIA 94 loops, AIA 171 no cool loops, no flux emergence, not at the limb)

b. QS network, close to disk center

**Priority:** AR mossy plage first, then QS network

**B. RBEs/RREs/jets in Quiet Sun / Coronal Hole**

**Aim:** study generation and thermal evolution of type II spicules

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**SSC Point of Contact:** SOT -- Dick Shine (LMSAL)

**Dates:** 2016/09/23 - 2016/10/06

**Time window:**

The best coordination time is from 8:45 am to noon La Palma time, which is 07:45 UT to 11 UT. During this La Palma time (7:45 to 11 UT), IRIS will focus on high cadence runs, such as sit-and-stare, small or medium rasters. A single target will be chosen for each day's observing in this time period. The IRIS planner and SOT CO would typically schedule large raster scans for context before or after the La Palma time, so that high cadence programs are run during La Palma time.

Every day from 11 UT to 17 UT, IRIS and SST will perform flarewatch on the most promising active region. Hinode is invited to do the same using its standard flarewatch programs.

**Target(s) of interest:**

A. Chromospheric Heating: AR mossy plage is first priority, then QS network

B. RBEs/RREs/Jets: strong network close to disk center,  $\mu > 0.9$ , IRIS slit should ideally be positioned just next to the magnetic network regions, crossing the chromospheric halo and covering jets shooting off from the network.

**SOT Requests:**

Run an SP fast map of the target region just before 7:45 UT and just after 11 UT, to provide context and aid in coalignment with the other instruments; this should be 40 - 160 arcsec wide, depending on the target size. All of the science goals need a high cadence, repeating SP program during the SST prime time: dynamics mode (full resolution) or very fast map (2x2 summing). Minimum width is 9 arcsec for very fast map (72 second cadence) or 5 arcsec for dynamics mode (63 second cadence). Wider maps may be requested at proportionally slower cadence for some targets.

**EIS Requests:**

Run suitable studies for the target of the day. The EIS CO may choose to do a large map covering the IRIS FOV when IRIS does a large raster, then switch to a faster cadence program when IRIS does dynamics or wave programs. The IRIS planner may request a program described in one of the IHOPs (243 or 306) for a particular target.

**XRT Requests:**

Run suitable imaging program for the target of the day. The IHOP 306 program is suitable for an AR target.

**IRIS Requests:**

The IRIS planner must submit his/her plan by 19 UT on Mondays - Fridays; the Friday plan runs for 3 days. No changes whatever are possible after ~21 UT of each weekday. The IRIS planner will announce the target type (one of the above list) for each day's observing in the 8-11 UT period at least 2 days in advance, so the Hinode daily meeting can plan to coordinate with suitable programs. More specific pointing information will be provided in time for the Hinode daily meeting before uplink. The AR for flarewatch in 11-17 UT will also be announced.

**Additional instrument coordination:**

The observers at the SST will follow the IRIS target every day during the prime observing time of 7:45-11 UT, and usually during the flarewatch time of 11-17 UT.

**Previous HOP information:**

HOP 236, 257

References:

"Fan-shaped jets above the light bridge of a sunspot driven by reconnection," Robustini et al, *Astronomy & Astrophysics*, Volume 590, 2016

"On the Active Region Bright Grains Observed in the Transition Region Imaging Channels of IRIS," Skogrud et al, *The Astrophysical Journal*, Volume 817, 2016.

"Evidence for a Transition Region Response to Penumbra Microjets in Sunspots," Vissers et al, *The Astrophysical Journal Letters*, Volume 811, 2015

"Ellerman Bombs at High Resolution. III. Simultaneous Observations with IRIS and SST," Vissers et al, *The Astrophysical Journal*, Volume 812, 2015

**Additional Remarks:**

Links to the IRIS timelines, pointings, and coordination calendar may be found at:

<http://iris.lmsal.com/operations.html>

Pointing images are at <http://www.lmsal.com/hek/hcr?cmd=view-planned-events&instrument=iris>

and IRIS OBS IDs at the IRIS Coordination Calendar link on the operations page.