Solar missions with JAXA





EUVST: effective areas of 10-30 times larger than previous instruments high spatial (0.4 arcsec at maximum) and temporal (less than 1 sec) resolution. EUVST will seamlessly observe the wide temperature range from the chromosphere (about 10,000 Kelvin), the corona (about 1 million Kelvin), and even the flare plasmas (about 10 million Kelvin). Launch: 2028.

ρποα Σννις

- Understand how solar atmosphere becomes unstable, releasing the energy that drives solar flares – achieved through probing fast time cadence solar flare variations.
- Measuring solar irradiance that impacts the Earth's thermosphere and the mesosphere, linking to spatially resolved measurements of the solar atmosphere with EUVST.

Solar Spectral Irradiance Monitor on board of Solar-C

Sun-as-a-Star spectroradiometer operating on EUV and Lyman-α bands working alongside EUVST

Small mass and volume instrument – 2 channels overlapping with EUVST

- Channel 1: (170-215 A)
- Channel 2: (1115-1275 A)

 Understand how solar atmosphere becomes unstable, releasing the energy that drives solar flares – achieved through probing fast time cadence solar flare variations.

Van Doorsselare et al., Lyman alpha – periods of 8.5secs and 75 secs attributed to MHD modes.

Observe all solar flares on the disk.

High time resolution of the corona (channel 1) and lower atmosphere (through channel 2) - nominal cadence of 50 Hz (20 ms), high cadence of 200 Hz (5 ms)

• Measuring solar irradiance that impacts the Earth's thermosphere and the mesosphere, linking to spatially resolved measurements of the solar atmosphere with EUVST.

Channel 1 – EUV emission ionizes atoms in the ionosphere between 200-400km Channel 2 - ionizes below 100km.

Now-casting of the Earth's atmosphere

- We will use the irradiance measurements from SoSpIM to determine the atmosphere response to flares.
- This figures shows the response to the X9.3 flare in Sep 2017 -Highly significant NO increase by up to 150% is visible in the upper mesosphere (Bessarab et al., 2020)

SoSpIM: outlook

- Brings together solar, climate and ionospheric communities
- Partners and responsibilities:
 - PMOD (CH) Principal Investigator
 - ROB (BE) Detectors and Filters and Radiometric Modelling
 - FHNW (CH) Data Processing and Distribution Chain
 - PTB (DE) EUV Calibration
 - JAXA
- Phases currently funded:
 - Phase A2
 - feasibility study concluded Q1/2022 with release of instrument specifications
 - Phase B
 - preliminary design and EM subsystems manufacturing: on going
 - PDR process planned Q3/2023
- Phase CD:
 - Proposal for C/D approved

