Release notes

This data pack contains Solar Orbiter/SPICE data recorded during Short Term planning Period 122 (STP122, Nov. 16-23, 2020). This data was acquired early in the mission, under variable instrument configurations. While useable for scientific analysis, this "technical release" is primarily intended as a test for expert users willing to assess the data quality prior to the first full science data release.

Due to the inherently complex nature of the SPICE data, we only distribute the Level 2 (calibrated) data for this release. In case issues in the Level 2 data are found that require to investigate the conversion from Level 1 to Level 2, access can be granted to the Level 1 data and to the software used to convert it. The processing software will eventually be released in SolarSoft. However, it should be clear that Level 2 data is the data product that scientists should use for their research. Level 2 data takes into account all the calibration parameters quantified at the time of the release.

Documentation

- The SPICE instrument is described in: SPICE consortium et al 2020, A&A
- The processing steps applied to produce the L2 data are described in section 3.3.3 of the Data Product Description Document
- A very preliminary version of a SPICE data user's manual

Known limitations

- The wavelength calibration is the pre-flight one. In-flight wavelength calibration is on-going. The wavelengths calibration will be updated in subsequent releases.
- Burn-in of the detector is not yet taken into account. At the time of the release however, there is no evidence of significant burn-in.
- The pointing as reported in the headers is based on pre-flight measurements of the co-pointing between SPICE and the spacecraft. Registration by cross-correlation is required before the data can be compared with that from other instruments.
- The spatial resolution is lower than measured pre-flight: 5.4" from ground tests, 6.7" in flight.

- The spectral resolution is lower than measured pre-flight: (a) 2" slit, SW channel: ground test – 4.7 pixels, flight – 7.8 pixels; (b) 2" slit, LW channel: ground test – 5.3 pixels, flight – 9.4 pixels.
- There is a systematic bias in measurements of Doppler velocities correlated to the intensity gradients — an effect qualitatively similar to what was reported in SoHO/CDS (Haugan 1999) and Hinode/EIS (Young et al. 2012; Warren et al. 2018), although with a larger magnitude. The source of this bias appears to be a combination of anisotropic PSFs (i.e., astigmatism) in both the telescope and spectrometer sections. An effort is on-going to model the effect and to devise corrective actions. As of today, we recommend not to interpret Doppler velocities in SPICE data without contacting the instrument team for advice.
- Sometimes two or more wavelength windows have been recorded adjacent to each other. One example is the Ly-beta line that is often covered by two adjacent windows to cover the full line. In the current level2 data these windows are still separate and need to be stitched together for analysis (this will change in future versions of the data where neighbouring windows will be combined).

SPICE release 0 data policy

Due to the preliminary nature of this private release, we request that the following policy is strictly adhered to:

- Data access is granted on invitation and supervised by the SPICE operations consortium PI.
- This first data release is not public. The data cannot be distributed further.
- The SPICE operations consortium will provide technical assistance during data handling. In return, co-authorship on eventual publications is required.

Citation & acknowledgements

Scientific papers using SPICE data must cite the SPICE instrument paper "SPICE consortium et al, A&A, 2020 DOI:10.1051/0004-6361/201935574". Papers using SPICE data must include the following statement in the acknowledgements section:

"The development of SPICE has been funded by ESA member states and ESA. It was built and is operated by a multi-national consortium of research institutes supported by their respective

funding agencies: STFC RAL (UKSA, hardware lead), IAS (CNES, operations lead), GSFC (NASA), MPS (DLR), PMOD/WRC (Swiss Space Office), SwRI (NASA), UiO (Norwegian Space Agency)."

The usage of SPICE images as online web graphics or in printed materials must mention "Image Courtesy: ESA/Solar Orbiter/SPICE".