

Usage Notes for Low Latency Data Solar Orbiter SWA Heavy Ion Sensor

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1 Synopsis

This document adds usage notes for the Low Latency (LL) from the Heavy Ion Sensor (HIS), part of the Solar Orbiter SWA instrument. The data is described in detail in the SWA Data Product Description Document (DPDD).

HIS produces four LL data products, two ratios and two 1D energy spectra. These data products are produced on the spacecraft and made available directly through the Solar Orbiter Science Operations Center (SOC) with no human review.

These Low Latency data products are provided as browse data, subject to change and are not suitable for publication.

2 Usage Notes

2.1 Off-nominal days

A list of off-nominal days is provided with this document, in the file SWA-HIS_low_latency_off-nominal_days.csv. During these days the instrument was undergoing testing, experienced an upset or for some other reason did not take nominal science data during a portion of the day. **Low Latency data on these days should not be used.**

Higher level data products discriminate off-nominal periods via internal quality flags at sub-day resolution.

2.2 Product-specific notes

2.2.1 O7/O6 ratio

The O7+/O6+ ratio has been shown to be a good indicator of solar wind properties, including solar wind type as well as CME boundaries and characteristics.

Validity: This ratio exhibits expected trends based on historical measurements. It is valid as a reasonable indicator of solar wind conditions most of the time.

2.2.2 C6/C5 ratio

The C6+/C5+ ratio has been shown to be a good indicator of solar wind properties, including solar wind type as well as CME boundaries and characteristics.

Validity: The validity of this ratio has not yet been established. It is not suitable for use at this time, even as a browse product.

2.2.3 Spectrum 1: Start rate

This product is the counting rate on the Start MCP as a function of E/q for each HIS scan. These spectra have been transformed to physical units with preliminary calibrations.

Validity: This spectrum is of use to indicate the general plasma and energetic particle conditions experienced by HIS at the time of measurement, as well as confirming nominal operation of the electrostatic analyzer system.

2.2.4 Spectrum 2: Alpha particle rate

This product is the alpha particle counting rate as a function of E/q for each HIS scan. These spectra have been transformed to physical units with preliminary calibrations.

The primary use of these spectra are to verify that HIS is properly making triple-coincidence measurements.

Validity: The scientific validity of this data has not yet been established. It is not suitable for scientific use at this time, even as a browse product.

3 Change Log

Rev.	Date	Primary Author(s)	Description
	27-Jun-2022	JMR, HIS team	Initial version.
	22-Jul-2022	JMR	Small revision to warning statements.