

## PRODUCTS 22

**unical\_shockpar\_tableset.csv ( unical\_shockpar\_tableset.json )**: The table contains a list of shocks (and their parameters) associated with ESP and SEP events, observed from Stereo A, Wind, ACE spacecraft from 2009. The shock parameters (the plasma beta, the angle between the mean magnetic field and the normal to the shock, the magnetosonic Mach number) for Stereo A spacecraft were taken from the Jian et al. Interplanetary Shock list (URL: [https://stereo-ssc.nascom.nasa.gov/data/ins\\_data/impact/level3/IPs.pdf](https://stereo-ssc.nascom.nasa.gov/data/ins_data/impact/level3/IPs.pdf) ) and the related ESP spectra are presented in detail in the paper Chiappetta et al. (2021) ApJ 915, 8 DOI: 10.3847/1538-4357/abfe09.

The shock parameters (the plasma beta, the angle between the mean magnetic field and the normal to the shock, the magnetosonic Mach number, compression ratio) for Wind and ACE, have been calculated using upstream and downstream time intervals of  $[t_{\text{shock}} - 9\text{min}, t_{\text{shock}} - 1\text{min}]$  and  $[t_{\text{shock}} + 2\text{min}, t_{\text{shock}} + 10\text{min}]$ , respectively. In these cases the normal vector of the shock (and therefore the angle  $\theta_{\text{Bn}}$ ) is calculated using the Mixed Mode 3 method. When the plasma data for the event is not available, the magnetic coplanarity method is used to determine the shock normal vector.

The table also contains information relating to the ESP and SEP spectra files, and to the turbulence analysis upstream and downstream of the shocks, if available. Columns:

- 1) time and date of the shock arrival at spacecraft;
- 2) the plasma beta ( $\beta$ );
- 3) the angle ( $\theta_{\text{Bn}}$ ) between the mean magnetic field and the normal to the shock;
- 4) the magnetosonic Mach number ( $M_{\text{ms}}$ );
- 5) the compression ratio ( $r$ );
- 6) the name of the spacecraft;
- 7) a flag which indicates if there is a SEP in progress or not;
- 8) the name of the SEP spectrum file (if available);
- 9) the starting time of the range used to calculate the SEP energy spectrum;
- 10) the ending time of the range used to calculate the SEP energy spectrum;
- 11) a flag indicating whether ESP spectrum is available;
- 12) the name of the ESP spectrum file (if available);
- 13) a flag to indicate if the data calibration procedure has been performed or if it has not been necessary;
- 14) the starting time of the range used to calculate the ESP energy spectrum;
- 15) the ending time of the range used to calculate the ESP energy spectrum;
- 16) a flag to indicate whether the PSD is available;
- 17) the name of the PSD file calculated in the upstream region of the shock (if available);
- 18) the starting time of the range used to calculate the PSD in the upstream region;
- 19) the ending time of the range used to calculate the PSD in the upstream region;
- 20) the name of the PSD file calculated in the downstream region of the shock (if available);
- 21) the starting time of the range used to calculate the PSD in the downstream region;
- 22) the ending time of the range used to calculate the PSD in the downstream region;
- 23) a flag to indicate whether the Structure Functions are available;
- 24) the name of the Structure Functions file calculated in the upstream region of the shock (if available);
- 25) the starting time of the range used to calculate the Structure Functions in the upstream region;

- 26) the ending time of the range used to calculate the Structure Functions in the upstream region;
- 27) the name of the Structure Functions file calculated in the downstream region of the shock (if available);
- 28) the starting time of the range used to calculate the Structure Functions in the downstream region;
- 29) the ending time of the range used to calculate the Structure Functions in the downstream region.