SECCHI EUVI Status

SECCHI Consortium Meeting, Dublin 2010

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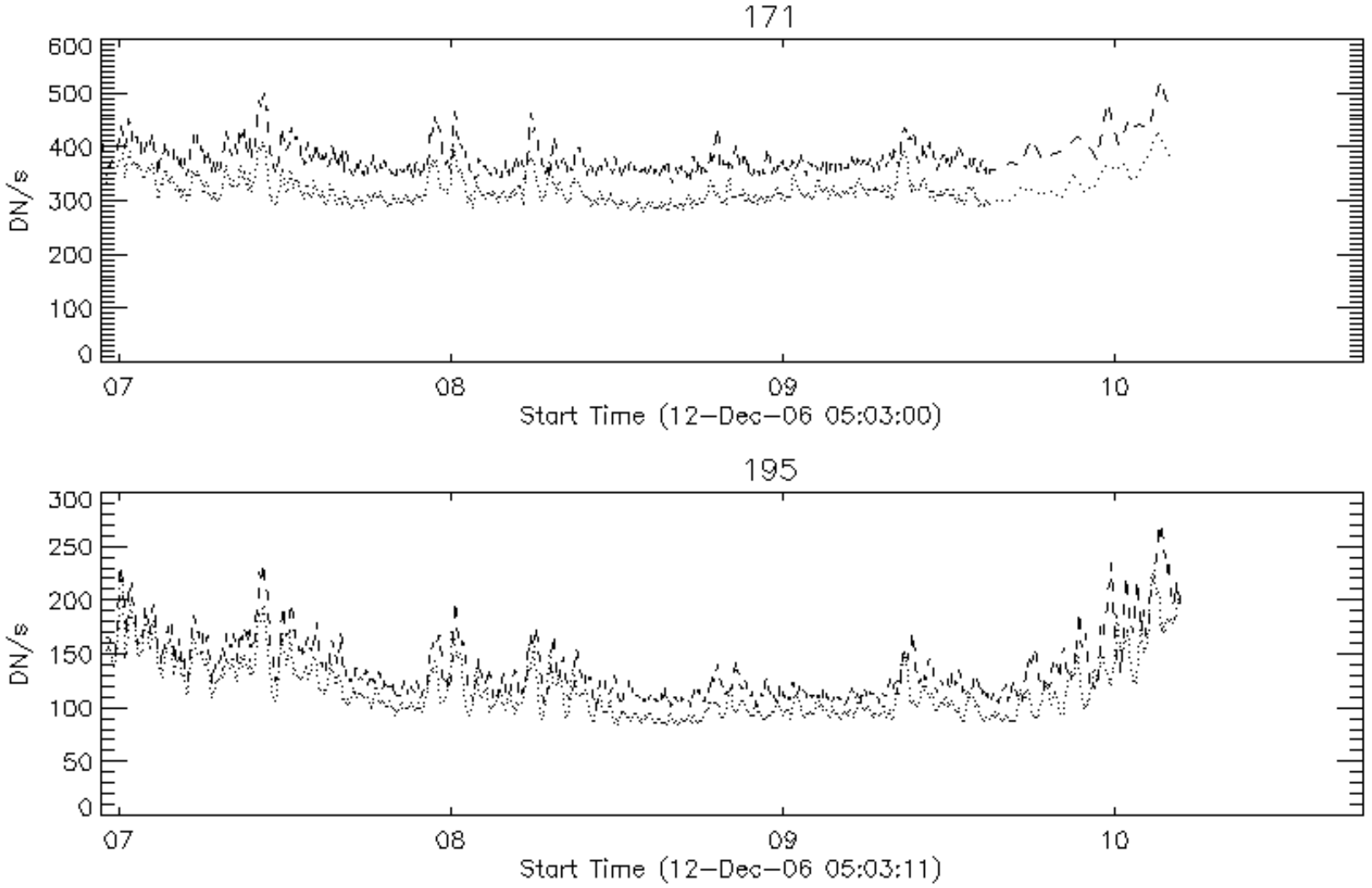
LMSAL

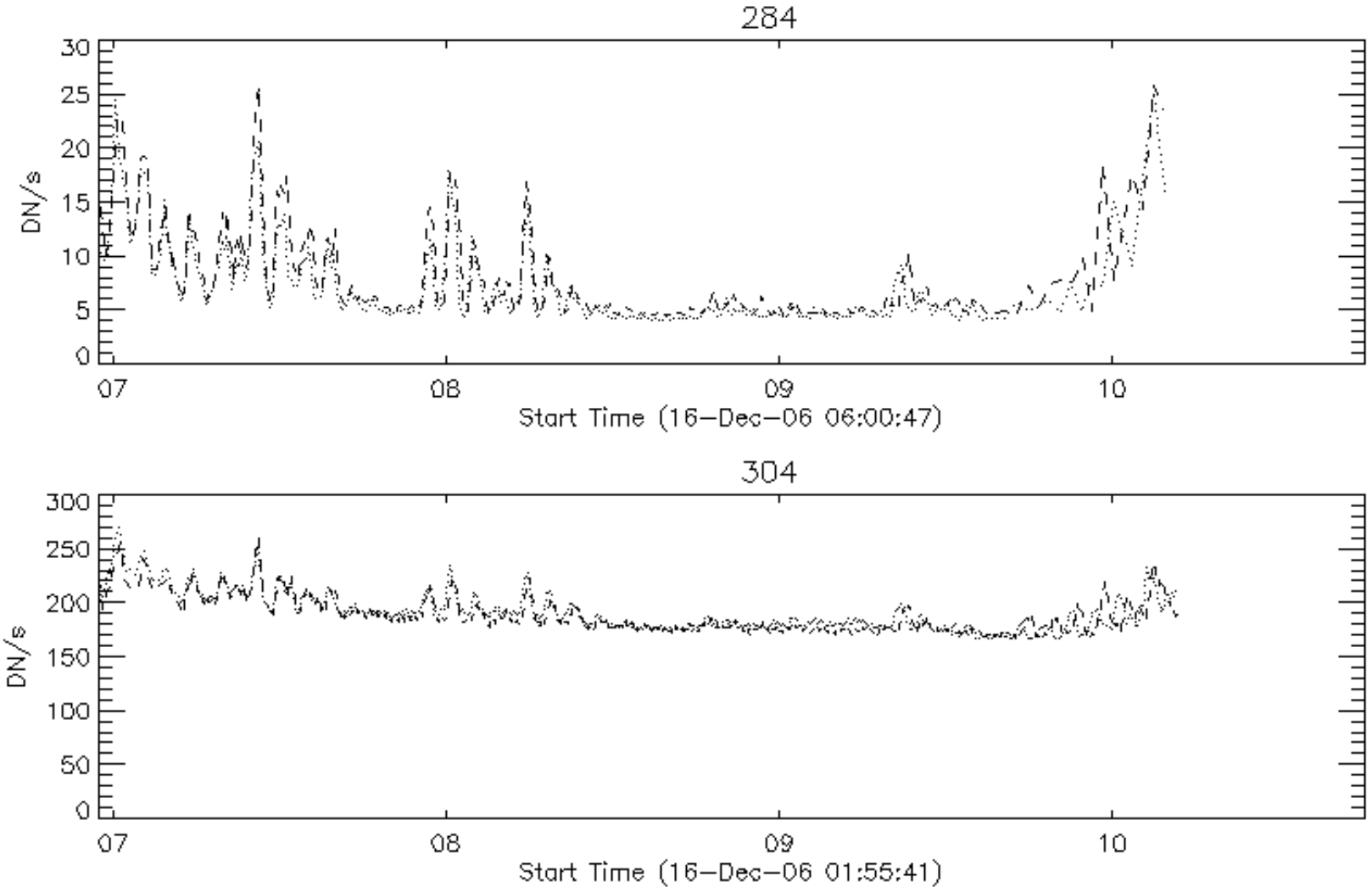
EUVI Status

- **Both EUVI telescopes perform extremely well**
  - **No hardware issues, no noticeable degradations**
- Sensitivity
  - Flux curves reflect evolution of solar activity
- Entrance filter status
  - All entrance filters show some light leaks, mostly at very low levels
  - Light leak levels through entrance filters have no impact on quality of normal observations
    - Standard filter in filter wheel completely suppresses residual white light
    - Exception: 284 on Behind: faint static stray light pattern below S pole, can be subtracted out
- Pointing / Attitude information
  - Both EUVIs show a ~ 2 pixel pointing drift relative to the GT
  - Empirical correction to FITS header is being worked on

EUVI Flux Trends – 171 & 195

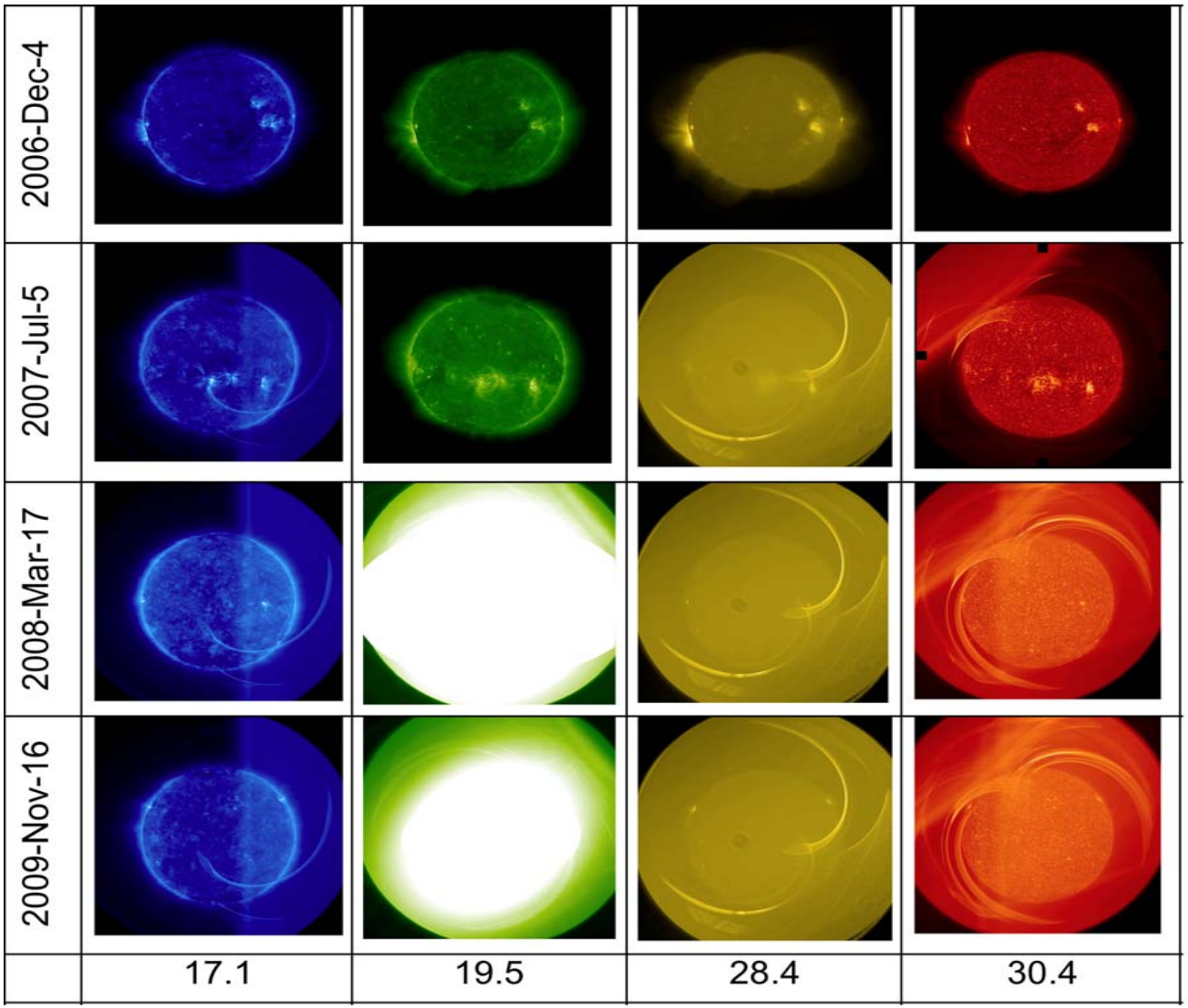


EUVI Flux Trends – 284 & 304



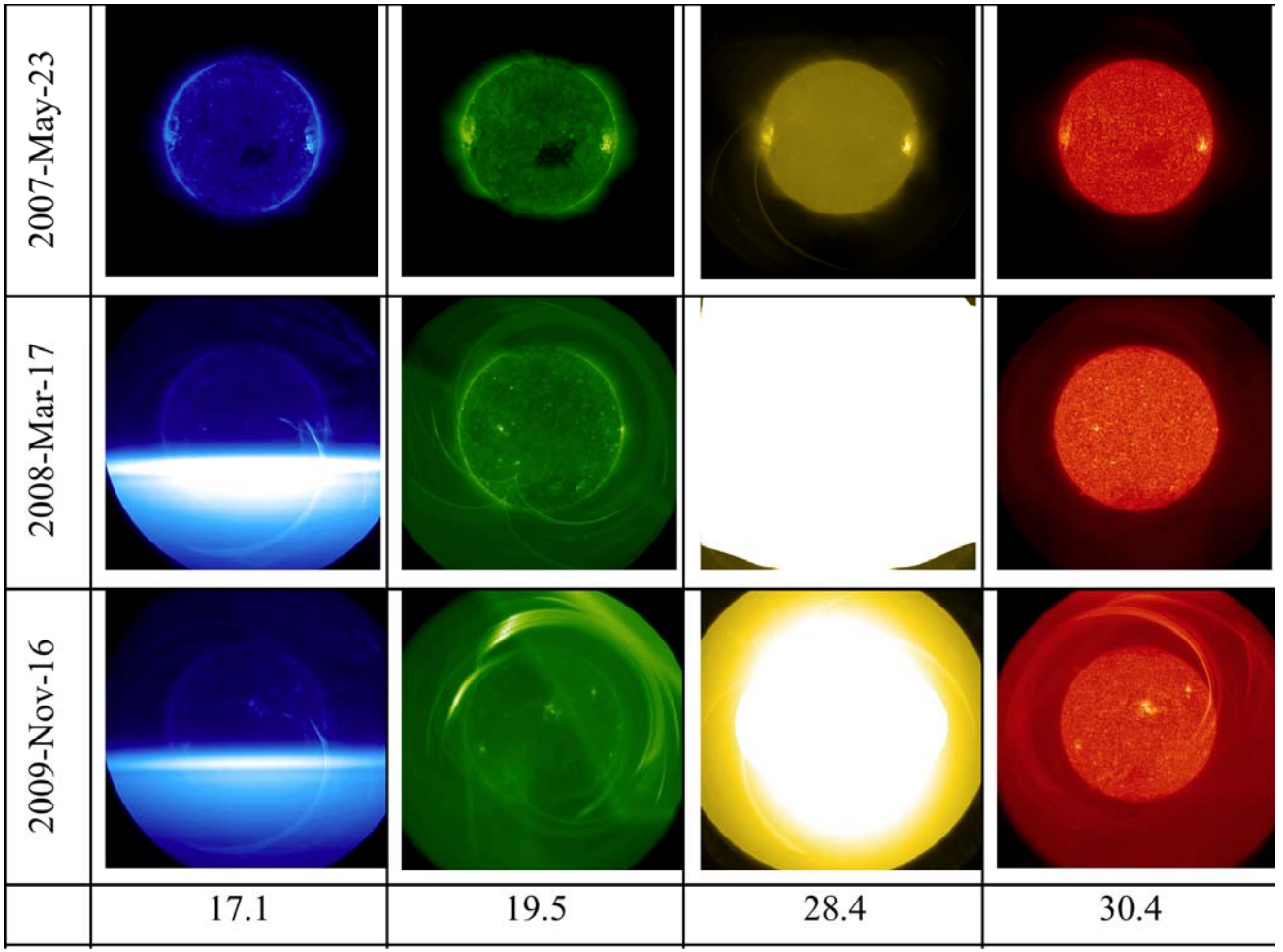
Entrance Filter Trends - Ahead

EUVI-A

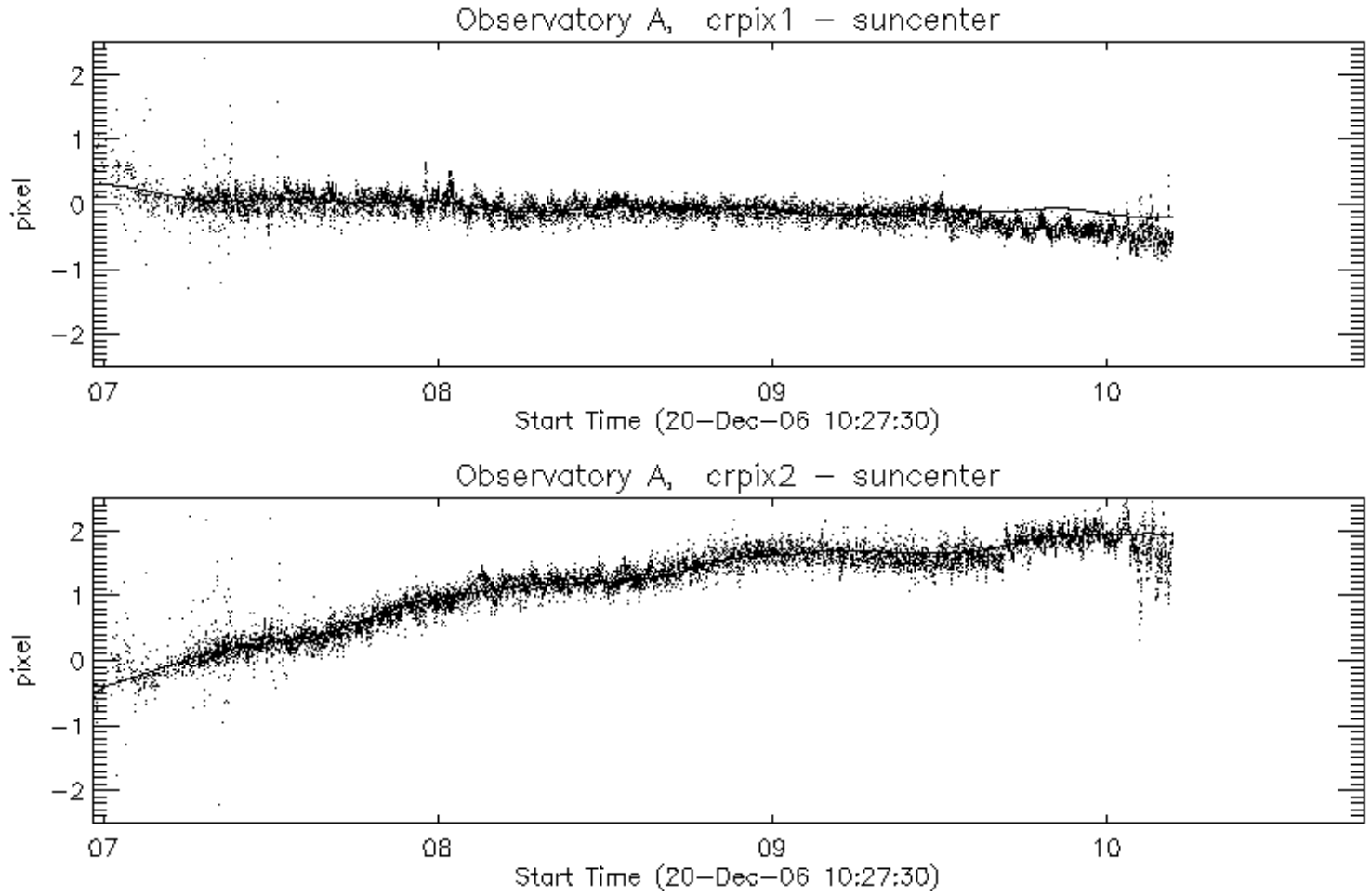


Entrance Filter Trends - Behind

EUVI-B

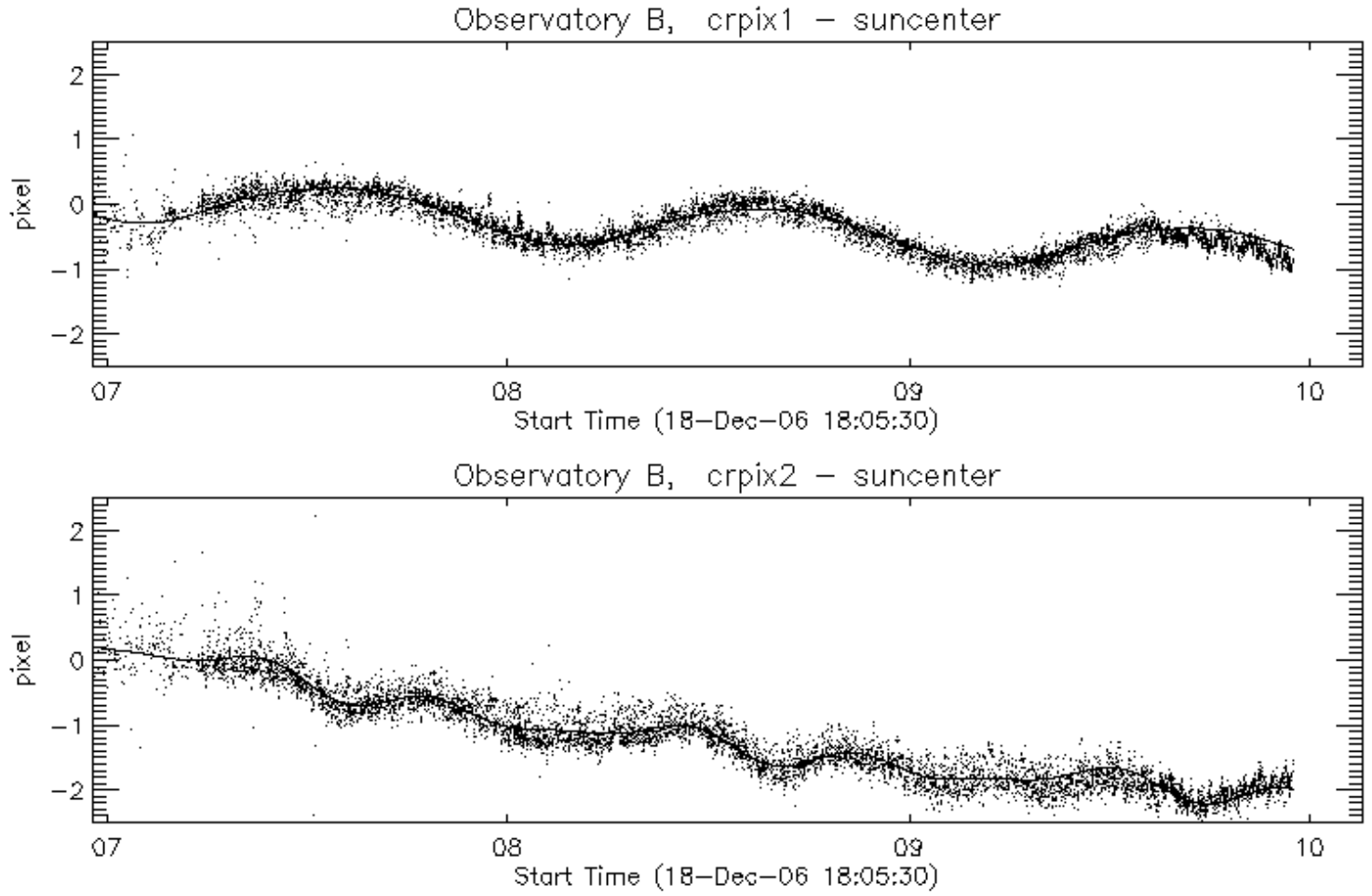


Attitude Data Trends - Ahead



Solid curve: best-fit through April 2009, extrapolation through March 2010

Attitude Data Trends - Behind



Solid curve: best-fit through April 2009, extrapolation through March 2010

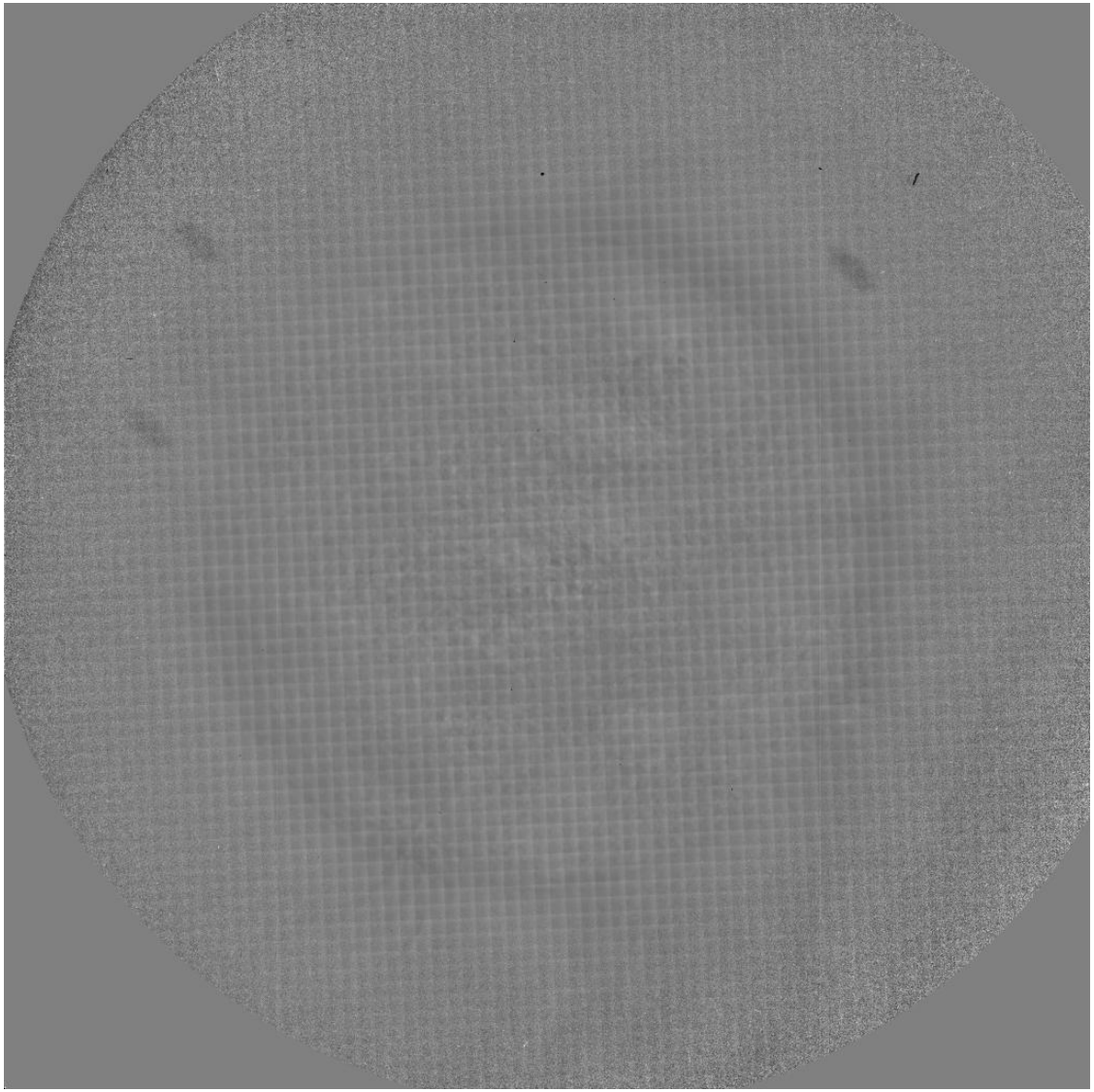
Spectral Response

- Available in SolarSoft:
  - Spectral response / effective area curves
  - Temperature response prediction (based on Chianti)
  - For details see “EUVI Software Notes” on the EUVI website (http://secchi.lmsal.com/EUVI/)
- Spectral response data based on:
  - Prelaunch synchrotron calibration of mirror pairs (IAS)
  - Prelaunch calibration of CCDs and entrance filters
  - On-orbit calibration of filter wheel filters
  - Response of B adjusted for observed ratios A/B in all 4 channels
    - Required adjustments were small: between +4% and -19%
    - Plan to cross calibrate with SDO-EVE in the future

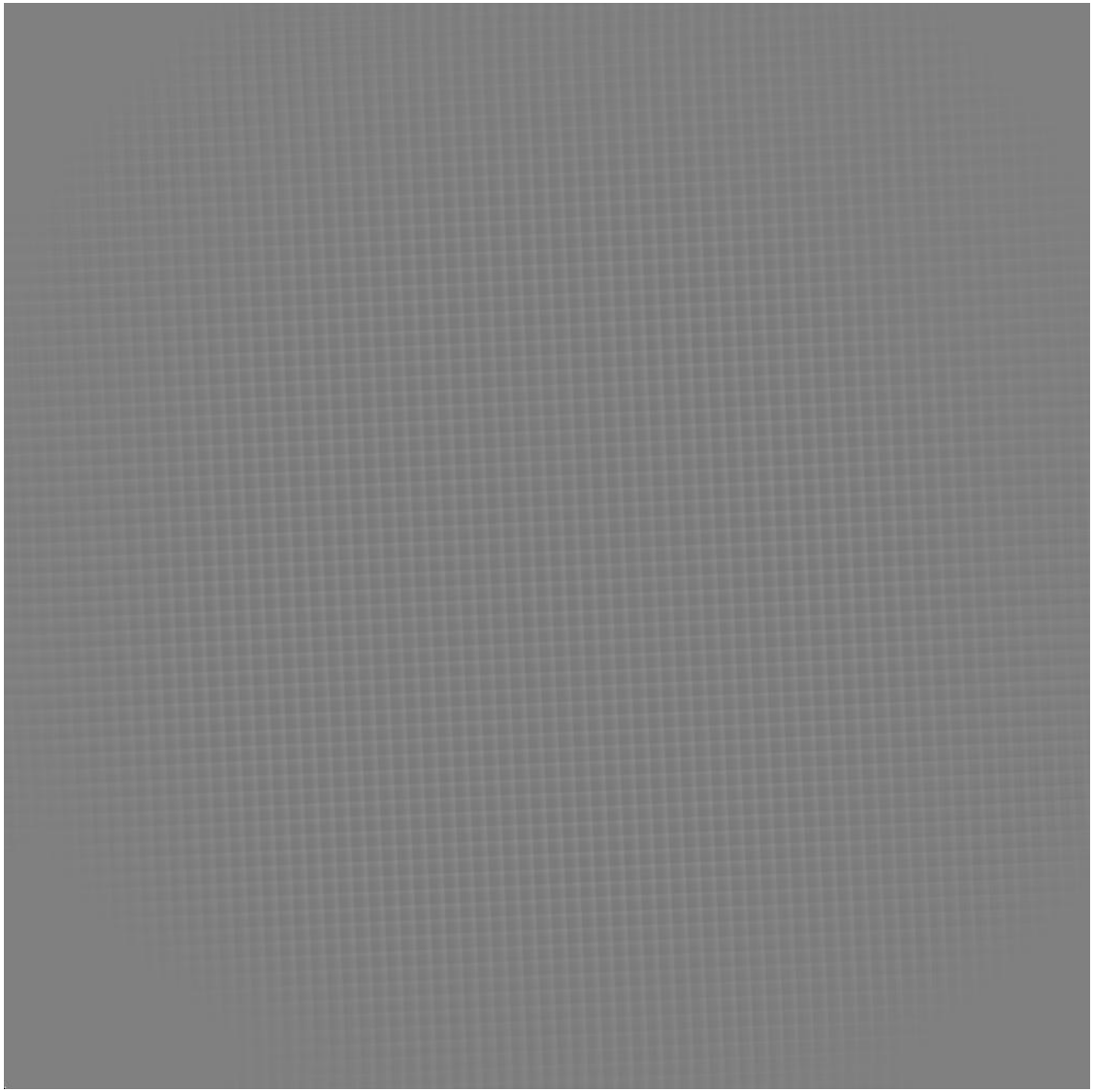
Flat Fielding

- Flat data in SolarSoft:
  - "Raw" flats (171 and 304)
    - Based on 14 images taken at pseudo-random offpoint locations
    - Show residual solar image and noise near edge of field
  - Processed flats (171 and 304)
    - Show only shadowing by mesh in filter wheel filter
  - Flats for 195 and 284 not yet distributed
  - For details see "EUVI Software Notes" on the EUVI website
- Flat fielding may not be needed in most cases
  - Peak-peak amplitude: 4% of signal (<< than EIT)
  - Raw flats may add fixed pattern noise

“Raw” Flat (EUVI-B @ 171)



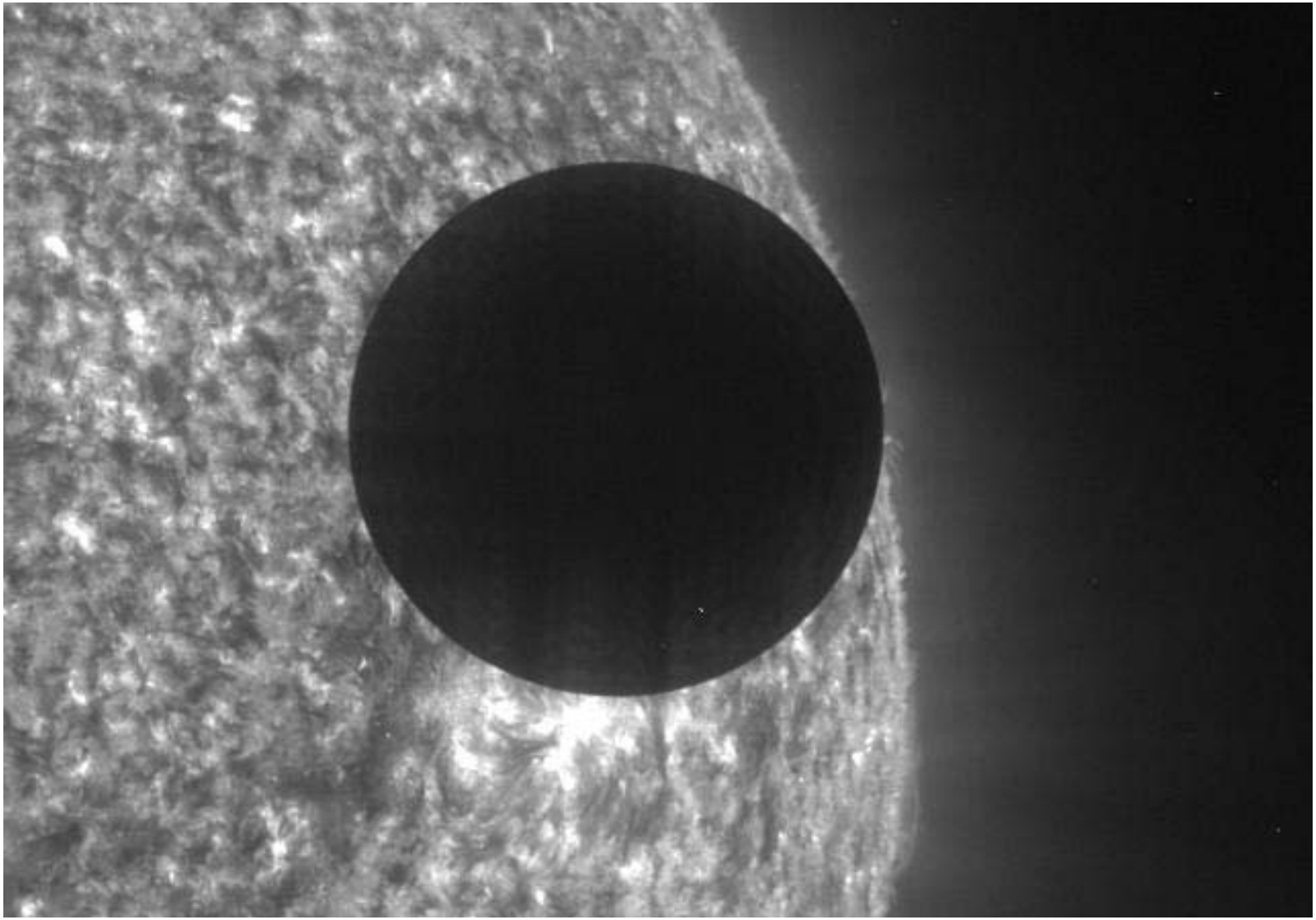
Processed: Mesh-Shadowing Only



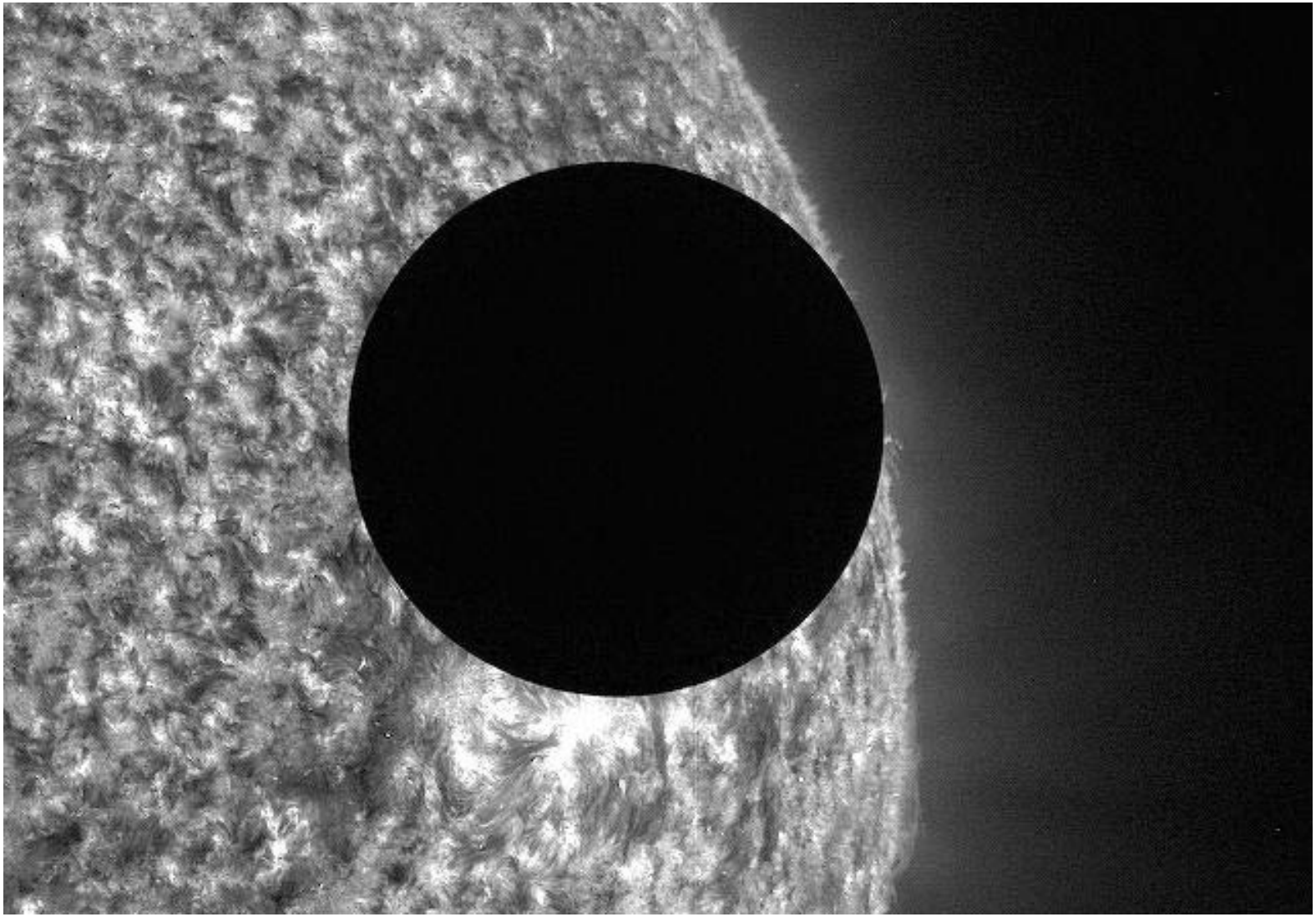
Point Spread Function

- EUVI_PSF.PRO
  - Best-estimate PSF for each wavelength and telescope
  - Available in SolarSoft
  - PSF properties based on fit to observations
    - PSF Voigt core determined via lunar transit observations
    - Diffraction at entrance filter determined via flare observations
- PSF successfully used to deconvolve EUVI images
  - Improves sharpness and contrast
  - Direct deconvolution works reasonably well
    - Even on ICER compressed data
  - MEM deconvolution for best results
    - Also removes cosmic rays

PSF - Lunar transit EUVI-B @ 304



304 Image Deconvolved with PSF

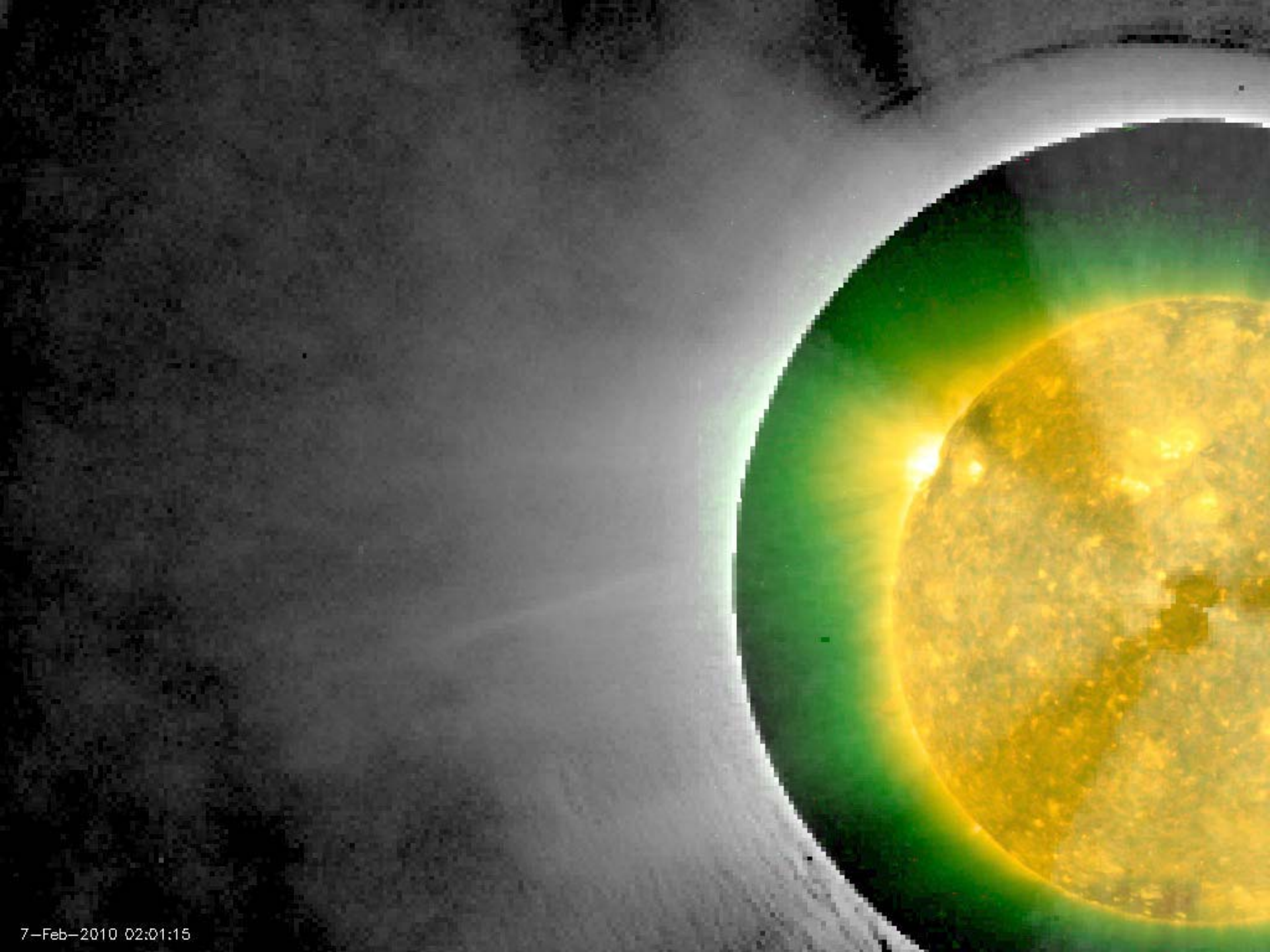


Synoptic Observing Program

- Current synoptic program (24 hours/day):
  - 195: 8-16 sec exp. 2.5−5 min cadence ICER5
  - 304: 4 sec exp. 10 min cadence ICER5
  - Every 2 hours:
    - Deep (16 sec) 171 exposure, ICER4
    - 284 exposure, 32 sec, ICER6
  - Future downlink rate reductions may require elimination of frequent 304 images
- Special campaign observations possible
  - Limited options due to reduced downlink rates

Event Triggered Observing Program

- High cadence observations still possible
  - Into ring buffer (SSR2), overwritten every 3-4 hours
  - Buffer frozen via CME trigger on Cor2 image
- Successful CME event trigger on 2010 February 7
  - Ahead observatory only (synoptic data on Behind)
  - Excellent coverage of CME onset and evolution in Cor1
  - Cadences:
    - 75 sec in 171
    - 5 min in 195
    - 5 min in 284
    - 2.5 min in 304
    - 5 min in Cor1 (Total and Polarized Brightness)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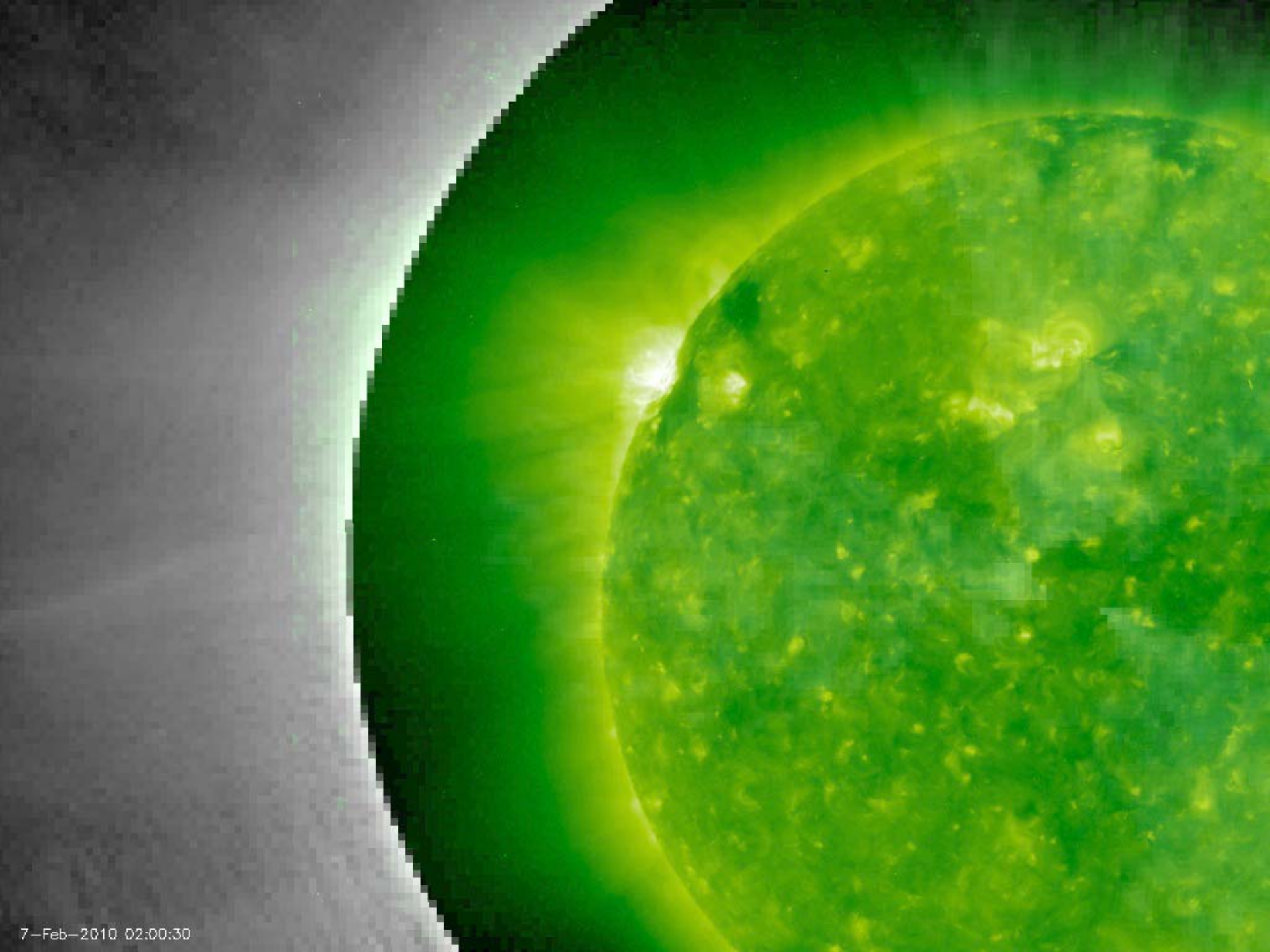
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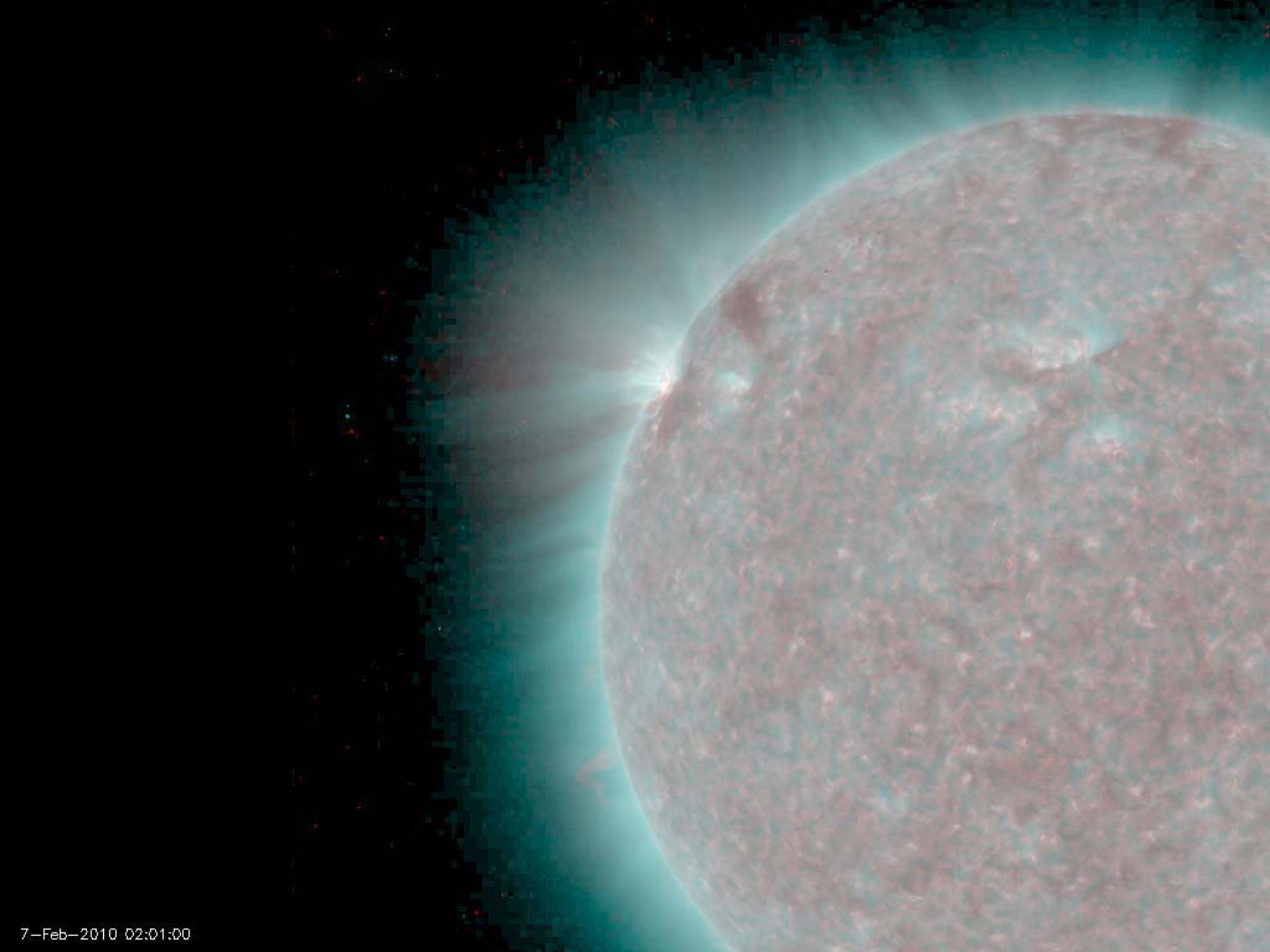
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