SECCHI, Best of

Russell A. Howard
13 Nov 2007
STEREO SWG
Putting All 10 Telescopes Together

Images from 3 June 2007

Venus

Earth and Moon
“Global View” - The movie
14 April-24 June 2007
Comet Encke Tail Disruption
16-24 April 2007

- Note that the disconnection occurs after the brightness enhancement of the leading edge of the CME
- => Disruptions due to reconnection of the magnetic field in the CME with the field draped around the comet, and not due to density effects
- Note also the disturbed nature at high southern latitudes, when the comet is crossing the boundary between slow and high speed
May 2007 – HI-1A

- Example of a clean stellar and background removal
- Outflows & CMEs clearly visible but generally confined to the low latitude slow solar wind
HI-2A July 12-Aug 9, 2007

- Example of HI-2 star & background removal
- Running differences
- Continuation of the flows seen in HI-1, some fade out and others get brighter – Thomson scattering effect
Neutral Fe Detection

- Faint, arch-like tail, identified with neutral iron
- Brightness decay along the tail agrees with a theoretical prediction of the photoionization rate
- Dotted line: comet's orbit
- Dashed lines: model ion tails moving at the given solar wind velocity
  - Best fits imply that wind speed increased from 200 to 400 km/s
- Continuous line: theoretical Fe tail
- Model: Neutral Fe atoms pushed away by radiation pressure
Fits of Neutral Fe Tail
• Compare the reconstructed loops with field lines derived from linear force free magnetic field models with variable alpha, the ratio of field-aligned current density to field strength

Stereo Loop Reconstruction (1)
Stereo Loop Reconstruction (2)

- Yellow – Observations
- Red – Closest fit MHD field lines
- Left View – STEREO A S/C
- Right View – From NE of AR

- Most of the loops cannot be approximated by planar curve segments, which was the usual simplification for reconstructions in the past
- Loops on open field lines appear more strongly curved than the corresponding MHD field lines => deficiency in linear force-free field extrapolation
- Alpha was different for open & closed field lines
Modeling of CME on 15 May 2007

Thernisien et al, SOHO-20
Modeling of CME on 15 May 2007 (2)
• CME extrapolated to HI-1 and HI-2 (see SWG_Thernisien_Model.pdf)
More “Best of”

- Angelos Vourlidas – More on Comet Encke and Loneas
- Spiros Patsourakis – EUV Waves
- Angelos Vourlidas – Observations of compression region at CIRs