Session 5: White light imaging of the inner heliosphere (Thu 07 May, 2009 14:00–16:00)

Note taker: Divya Oberoi

Huw Morgan – Some observational aspects of large-scale coronal structures

NGRF basic idea - subtract the mean and divide by the standard deviation, single radial profile for the entire images and entire movies.

Works for streamers, looses the detail. Smears out the high contrast structures. Cannot extract real densities any longer because of the normalization.

Not all high density features need to have a field reversal or be associated with current sheets.

Buffington – 1. Removal of background light from SMEI white-light-all-sky maps, and an all-sky imager design suitable for future deep-space missions

SMEI white light maps photometric to 1/10 of a percent, try to preserve this to the higher level data products.

For Aurora removal, average half the maps below the median

Buffington – 2. An all sky heliospheric future

Go to deep space – avoid moon and aurora.

Breen – Why not look at L4 and L5 for a future satellite?

Buffington. – Not easy to get out there and stop there.

Discussion

1. Cross collaboration/calibration
2. Daniel Brown – status of calibration for HIs – pointing calibration published.
3. Danielle – SECCHI_PREP – does shutter less correction for HI, applies appropriate flat fields (have better than pre-flight flats which are applied) and finally also applies pointing correction. This is the Level 1 data, available from the UK RAL site. Ongoing work – photometric calibration, motivation – improve large scale flat field, should happen soon. Smooth scale flat field, should also be available. Calibration to STEREO mag scale. If you have things you want get done, please 'shout', you might get on our to-do list. Here to help and please the community, let us know what you want.
4. Danielle – Background subtraction – a rudimentary SOLAR SOFT routine exists, but is not good enough. Steve is working on it.
5. Morgan – Are SMEI and STEREO are on the same wavelengths?

Buffington/Danielle - Similar but not the same for HI2, HI1 is very different.

6. Buffington – What do the astronomers wants

   Danielle - They want to look for extra-solar planets, so want light curves, 'pancake flat' flat fields, to a fraction of a percent.

   Buffington - Needs extremely good calibrations, might be unachievable.

7. Morgan – Astronomers interested in zodiacal light?

   Buffington – Not really, there is a different community Heliospheric community which is more interested in them.

8. Jensen – When you are looking away from the Sun and after you remove everything else, do you still see Thompson scattering.

   Buffington – Yes. If it cannot blamed to be from any other identifiable artifact, it is valid Thompson scattering.

9. Jensen – What about IRAS dust bands

   Buffington – They are at longer wavelengths (IR), NRL people have a model which they can fit what SMEI sees very well. Probably no new physics is needed.

10. Bisi – Why not do tomography with HI1 and HI2 and also combine it with SMEI? What are the prospects?

    Danielle – That is my primary motivation to be at this meeting. Have a meeting setup for tomorrow. This is definitely a goal.

    Buffington - We certainly intend to pursue it, there are no reasons to not do it.

11. Bisi– Looking for the sheath and the dense regions (STEREO/SOHO meeting)

    Jensen – A dense structure in a CME is usually a prominence erupting. Sometimes, the sheath develops in front of the CME and sometimes not, seems to depend upon the velocity of the CME.

12. Daniel/Danielle/Morgan/Bisi – CME modeling seems to have run a bit amock… croissant, ice-cream models… choose your favourite food.

13. Breen/Bisi – Reality is always more complicated than the simple models.

14. Daniel – Need more constraints from other sources – IPS or other sources.

    Breen – We should be doing increasing better with MWA/LOFAR

15. Bisi – Have sheaths been detected in Ooty data

    Manoharan – Yes, and we have also detected many weak CMEs, which don't seem to have been detected at other places (?)

16. Buffington – In context of the earlier question about L4/L5, if you want to turn a 2D picture into 3D density/velocity, what is important is how many lines of sight you have. Near Earth orbits, have the advantage that they have a lot of LoS near the earth. L1 still has a lot of lines close to the Earth, but it won't get as nice reconstructions close to the Earth. It is also a lot more difficult to get data back from L4/L5.

17. Breen – JNAM meeting wanted to put an instrument at L4/L5.

18. Jensen – How about L2?

    Breen/Bisi – Will pass through geo-tail quite often and a difficult plasma environment, reconnections etc.

    Danielle/Buffington/Daniel - Herchel/Plank are going to L2, if the orbit is big enough it is okay

    Worth finding out if this is an issue worth addressing

19. Bisi – What is the largest distance do you propagate your tomography to?

    Morgan – Out to 4 R_sun with a normalized density.

20. Bisi – What collaborations can be centered around events – what additional stuff can we learn and what exactly should we pursue

    Morgan – Happy to provide tomography maps for any events people are studying

    Danielle – Decide the questions you want to answer. HI data can be made available

    Jensen – Have archival FR data can post the dates for those. Happy to join in a collaborative effort and apply for more FR data as needed.

21. Bisi – 17-22 Nov 07 event, interesting event, geo-effective, enough conflict/confusion in the community. SMEI has some outages.

    Jensen – can check if we can get a Mulligan fit

    Oberoi – Include a simple text-book example, something well understood in different domains.

    Breen – Good idea to include a simple example.

22. Bisi – 24-28 Apr 08 might be a good one from that perspective. STELab not available for this period. SMEI outage

23. 11-15 Apr 08 – another possible event.

24. Andy Breen –

    a. CMEs – large scale structure and evolution and small scale structure behind it. SMEI/STEREO – great for CME structure and morphology and density evolution. IPS – rapid small scale evolution within the larger scale features + information about the background solar wind or solar wind in the neighbouring regions.

    b. Small scale physics – Turbulence evolution with the CMEs, sheath will be very different from what it is in the unperturbed SW and this will have a big impact on the evolution.

    c. Magnetic Field – FR measurements close to the Sun and close to the CMEs.

    d. Distortion flow – long baseline IPS observations, departures from radial flows, look for flow patterns around CMEs and maybe even inside CMEs. B field should be sort of parallel to velocity in the background SW, but not in CMEs.

    e. In-situ obs. – give the ground truth, comparisons are a must.

    f. Bring all this together for 2 events of quite different character, to start with. BTW, there is no such thing as a typical CME.

25. Mario – The only thing to add is

    a. The example from Dave Webb's. Solar Phy STEREO Special issue where 2 very different features on the height/elongation time plot turn out to the same event. One at a much higher(?) latitude but moving out much more slowly as compared to the other.