



SDO/HMI observing, the big picture

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Outline



- **Status**
- **Problems:** <http://sun.stanford.edu/~schou/hmi/commis/issues.txt>
- **Conclusion**



Status



- Things are fine



Problems

- **Image quality:**
 - Scattered light not reported or corrected for.
 - The correction of the disk center for the distortion leaves a 0.16 pixel y-offset of the images.
 - We do not yet have a very good estimate of the P-angle.
 - Lunar transit data is giving variations of 0.1 degrees or so.
 - Regulus observations may also help.
 - The image scale is not accurately known.
 - Lunar transit data and Regulus observations may also improve this.
 - Residual distortion.
 - We still see distortion in the images.
 - Also we can't combine the cameras.



Problems

- **Image quality - continued:**

- The height of formation correction to the image center is based on FID
- Does not take into account filter drifts.
- Also it may cause a small offset in the radius.
- There are a bunch of garbage cosmic ray records left.
 - The limits for the cosmic ray finder do not properly reflect tuning changes.
- Residual flat field errors.
 - We still see an artifact in the observables power spectra.
 - Rotational flatfields have not been implemented.
 - Large scale flatfield variations are not well constrained between the times offset flatfields are made.
 - Flat fields are not good enough to be able to combine data from the two cameras.
- Time after eclipses not marked
 - Images are of focus.



Problems

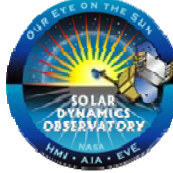


- **Non-vector observables calculation:**

- Improve the Fe I line profile used to obtain the look-up tables
 - Use different profiles as a function of magnetic field strength and inclination
- Improve the calibration of the non-tunable transmission profile
 - Revisit ground-based data
- Take I-ripple into account in the transmission profiles of the filter elements
- Implement a least-squares fit, instead of the MDI-like algorithm
- For the MDI-like algorithm, use the second Fourier coefficients
 - It's probably related to the issues of finding a better iron-line profile and improving the calibration of the non-tunable elements)
- Get rid of the front-window fringes in the look-up tables
- For the MDI-like algorithm, implement look-up tables for the continuum intensity, linewidth and linedepth
- Implement a time-dependent calculation of the filter-transmission profiles for v_{fisv}



Problems



- **Non-vector observables calculation - continued:**

- Make other observable products available
 - Tom and Junwei are using the "core-intensity", i.e. continuum-linedepth, and it would be more convenient if a series existed instead of them having to calculate their own products.
- For the MDI-like algorithm, instead of using 1 look-up table for up to 6 months (interval between re-tuning), produce 1 look-up table per detune sequence taken, and implement a temporal interpolation between these look-up tables
 - The main difference should be that the Michelson drift is taken into account, but it's already taken into account by the polynomial correction.
- Modify the QUALITY keyword returned by the observables codes so that it is more informative than it is now.
- In the observables code, improve the decision-making process regarding whether or not to calculate observables: e.g., currently if for the temporal interpolation a given number of filtergrams are missing, the code does not produce observables, regardless of the location of these missing filtergrams...



Problems



- **Vector observables calculation:**
 - Part of the polarization dependent psf is still not corrected.
 - In particular the spatially dependent component.
 - Similarly only an axisymmetric correction is made to the telescope polarization.
 - The telescope polarization is a misnomer and not physically based.
 - Time dependence of the polarization calibration is ignored.
 - No on-orbit checking is performed.



Problems



- **General issues:**

- HCM algorithm causes 135s period in mean velocity.
- Mean intensity of images is drifting and not in the same way for the two cameras.
 - Cause unknown.
- There is no tracking of which code versions are used, when they change and what the differences are.
- There is very little documentation of what is actually implemented.
 - What is in various papers is not what is actually done.



Conclusion



- Any questions?