HMI Far-side Imaging from Holography

Notes from the meeting

Stanford University -- March 7-9, 2007
Specify required pipeline input data products, including ancillary data and data products (e.g. inversion kernels)

- 2048 min series of HMI full disk calibrated dopplergrams
- Solar model
- Dispersion table
- Map of "ghost" signature (phase correction)

Describe output data products – format, organization, production schedule

- Postel projected far-side map
- Longitude-sin(lat)
- LOS
- North/South hemisphere views
- Combined far-side maps + magnetograms
- JPEG's files
- Temporal cadence?
- Keep ingress/egression calculations
Specify algorithms, parameters, and metadata as appropriate for pipeline analysis

• By now, reusing MDI far-side pipeline

• Considering:
  – Possibility of using fast track to track and postel project the data
  – Inclusion of extra skips
  – Spherical Harmonic filter

Establish testing & validation procedures

• TBD
Name person(s) responsible for pipeline module implementation, including both algorithm experts and persons familiar with the pipeline system

Short-Term tasks:
• Testing fastrack to generate the postel-projected data cube (P. Scherrer)
  – Solar rotation removal
  – Filling gaps
  – Interpolation
• Documenting “t_regress”: C. Lindsey, D. Braun and I. González)
  – Detailed description of input and output.

Research topics:
How to remove the “ghost” signature
Does using different/more skips benefit the maps?
Spherical Harmonic Decomposition filter
Calibration with artificial data

Establish implementation schedule

TBD
• TBD
GONG’s Far Side Pipeline

**makefsmap**
- Check if re-processing
  - **makefsmerge**
  - Check duty cycle
- **runfs** → Calculate Far Side map (same as MDI)
- **addMagnetogram** → Combine FS map with front side magnetogram & add color
- Add grid & labels
- Create LOS version
- Send status e-mail
MDI/GONG core application

**makestage1**

- Track and postel project the images.
- Collapse (this is not done for GONG low res)

**makestage2**

- Stack the images into a cube
- Transpose to (t,x,y)
- De-trend and remove bad pixels
- Fourier transform and transpose back to (x,y,w)

**makestage3**

- Extract 2.5-4.5mHz frequency interval
- Transpose to (w,x,y)

**makestage4**

- Compute Green’s functions:
  - Compute GF’s parameters
  - Correct from dispersion (frequency dependent)
  - Create Green’s functions file
- Fourier transform GF’s
- Calculate Ingression & Egression core!!!
- Calculate correlation between Ingression and Egression

**makestage5**

- Smear map
- Phase correction
- Combination of 2x2 with (1x3 + 3x1)
- Longitude-sin(lat) re-projection of the map