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Scientific Data from Solar-B Solar Optical Telescope (SOT)

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This material describes what kinds of data will be produced from the focal plane package (FPP) of Solar-B Solar Optical Telescope (SOT).

The purpose of the material is to provide the SOT data information necessary for designing the data format and operation planning.

Variety of SOT Data

SOT Data (Observables) from FPP

Filtergraph (FG) Camera

- Filtergrams

- Broadband filter (G band, continuums etc)
- Narrowband filter ($H\alpha$), dark frame etc

- Magnetograms

- Dopplergrams

- Stokes I/Q/U/V images

Stokes-Polarimeter (SP) Camera

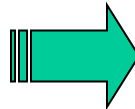
- Stokes Map

Correlation Tracket (CT) Camera

- Live/reference frames
- CT diagnostic (jitter) data
- CTM diagnostic data

MC (Macro-command)

Issued from MDP
observation tables

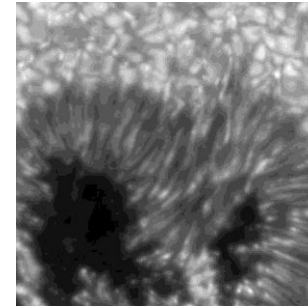
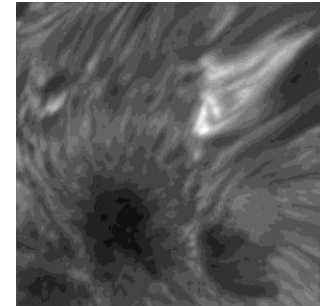


Engineering data
for jitter performance

Filtergrams

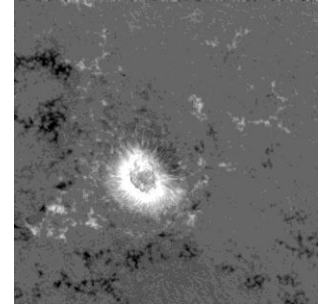
- 2-D spatial data
- Size (typ.): 2K x 4K pixels (max)
 - 2K x 2K
 - 1K x 1K
 - 0.5K x 0.5K (from combination of FOV size + pixel sum)
- λ scan filtergrams (X x Y pixels) x N (N= # of λ scan)
- Wavelength (typ.)
 - Broadband filter (6)
 - CN I 3883, CaII H 3969, CH I 4305, Continuum 4505
 - Continuum 5551, Continuum 6684
 - Narrowband filter
 - various λ positions in H α 6563, HeNe, (and bands including lines mainly used for Magneto/Dopper-grams)
 - Dark frame
- Exposure duration
- FOV center in CCD center for full frame, non-zero for partial frame images

G-band 4305

H α center

Magnetograms

- 2-D spatial data generated on-board from multiple exposures
- Size (typ.): 1K x 2K x N (smart memory limit)
1K x 1K x N
0.5K x 0.5K x N (from combination of FOV size + pixel sum)
(N= 1 or 2 [Magnetogram V and I])
- Wavelength (typ.)
Mg Ib 5173, Fe I 5247, Fe I 5250, Fe I 5251,
Fe I 6302, Fe I 6303, Ti I 6304
- Exposure duration
- FOV center in CCD center for full frame, non-zero for partial frame images
- Some wavelength offsets from line center to generate magnetograms



Dopplergrams

- Similar to Magnetograms
- Wavelength (typ.)
Mg Ib 5173, Fe I 5576

Stokes IQUV

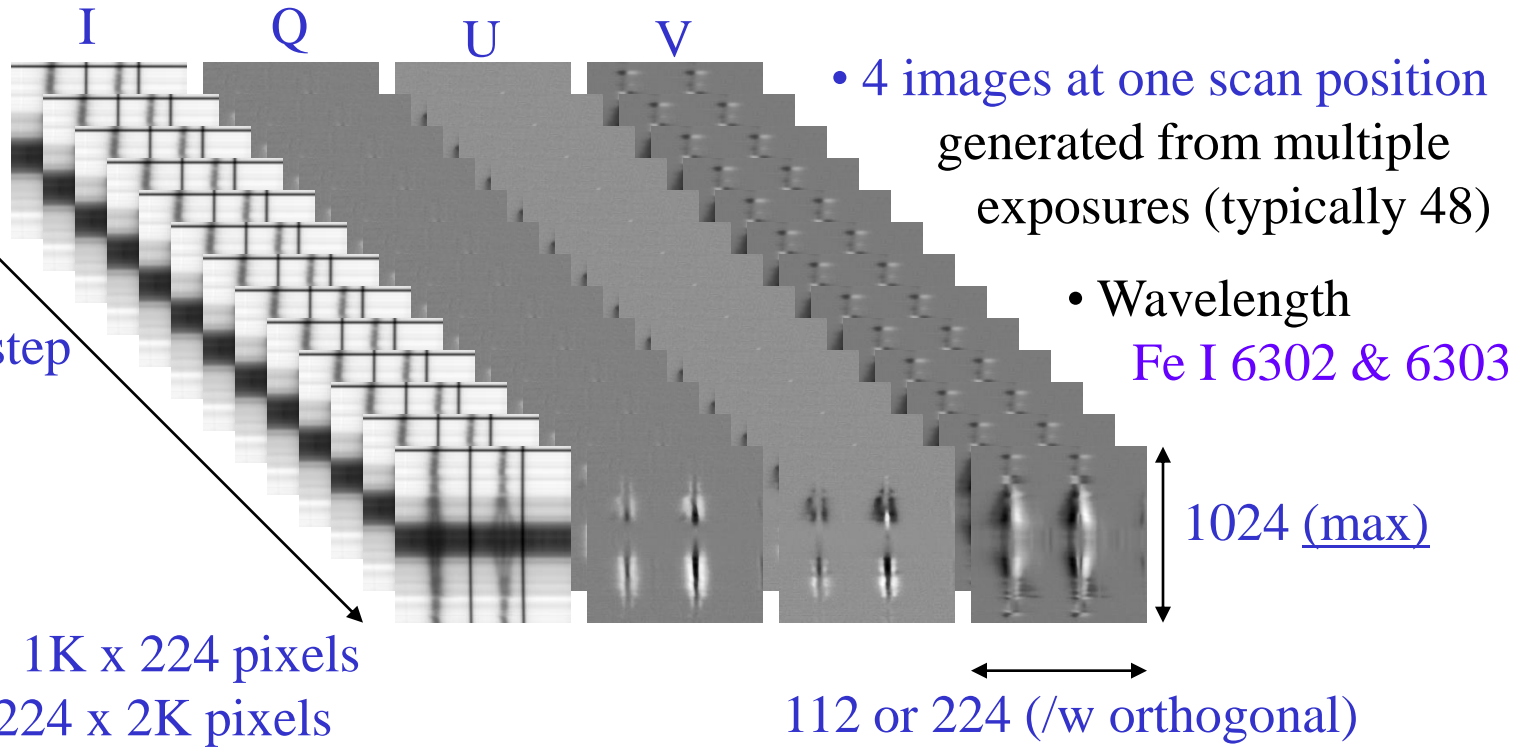
Stokes IV

Stokes IQ

Stokes IU

- A set of 2-4 different images of 2-D spatial data generated on-board from multiple exposures
- Size (typ.):
 - Shuttered exposures 1K x 1K x N pixels
0.5K x 0.5K x N
 - Shutterless exposures 1K x 256 x N
1K x 128 x N (N= 4 or 2)
(from combination of FOV size + pixel sum)
- Wavelength (typ.)
Mg Ib 5173, Fe I 5247, Fe I 5250, Fe I 5251,
Fe I 6302, Fe I 6303, Ti I 6304
- Integration # of Exposures
- (FOV center in CCD)
- Some wavelength offsets from line center

Stokes Map



- Size (typ.):
One Stokes: 1K x 224 pixels
Map: 1K x 224 x 2K pixels
896M bytes (without compression)
135M bytes (15% compression)

- Integration # of Exposures
- Map center position and # of slit scan positions
- Slit scan step size/pixel binning & slit scan summation
- Tip-tilt mirror (CTM) reset, repeat observation