Solar DEM Model Proposal

$$E(I_b|\theta) = \sum_{i=1}^{I} \alpha_i \sum_{t=1}^{T} \beta_t M_{bit}$$

I_b : A solar image in color band *b*, m×n pixels, containing a particular solar feature, for b= 1, 2, … B

M_{bit} : The expected *m×n image in color band b originating from a unit volume of ion i at temperature t, for i = 1, 2, . . . , I and t = 1, 2, . . . , T.*

Solar DEM Model Proposal

$$E(I_b|\theta) = \sum_{i=1}^{I} \alpha_i \sum_{t=1}^{T} \beta_t M_{bit}$$

α_i : the volume (abundance?) of ion i

β_t : the proportion of the total volume at temperature t

Solar Dataset

- 15 Filters.txt files:

  The temperature response of each of the Hinode/XRT filter combinations

  With column 1 being the temperature in log10([K]) and column 2 being the expected rate [DN/s] for an isothermal Emission Measure of 1e25 cm^-5/pix.

Solar Dataset

- For example: Be-med.txt

  4.00000 $8.7508906e{-}53$

  4.05000 $6.8570777e{-}47$

  4.10000 $1.3714081e{-}46$

  4.15000 $4.3631588e{-}41$

  4.20000 $8.7262623e{-}41$

  4.25000 $8.6016931e{-}38$

  4.30000 $1.7194660e{-}37$

  ….

Solar Dataset

- 348 FITS files of a sequence of solar images obtained in July 2008 and processed by Steve Saar. Most images used Be_med_Open filter.

- The files are in chronological sequence, and are named in the format
      xrt_NNN_Filt1_Filt2.fits

- The observation dates and exposure times are written into the file headers.

Solar Dataset

- For example: xrt_000_Be_med_Open.fits
Header:
BITPIX =   -32 /
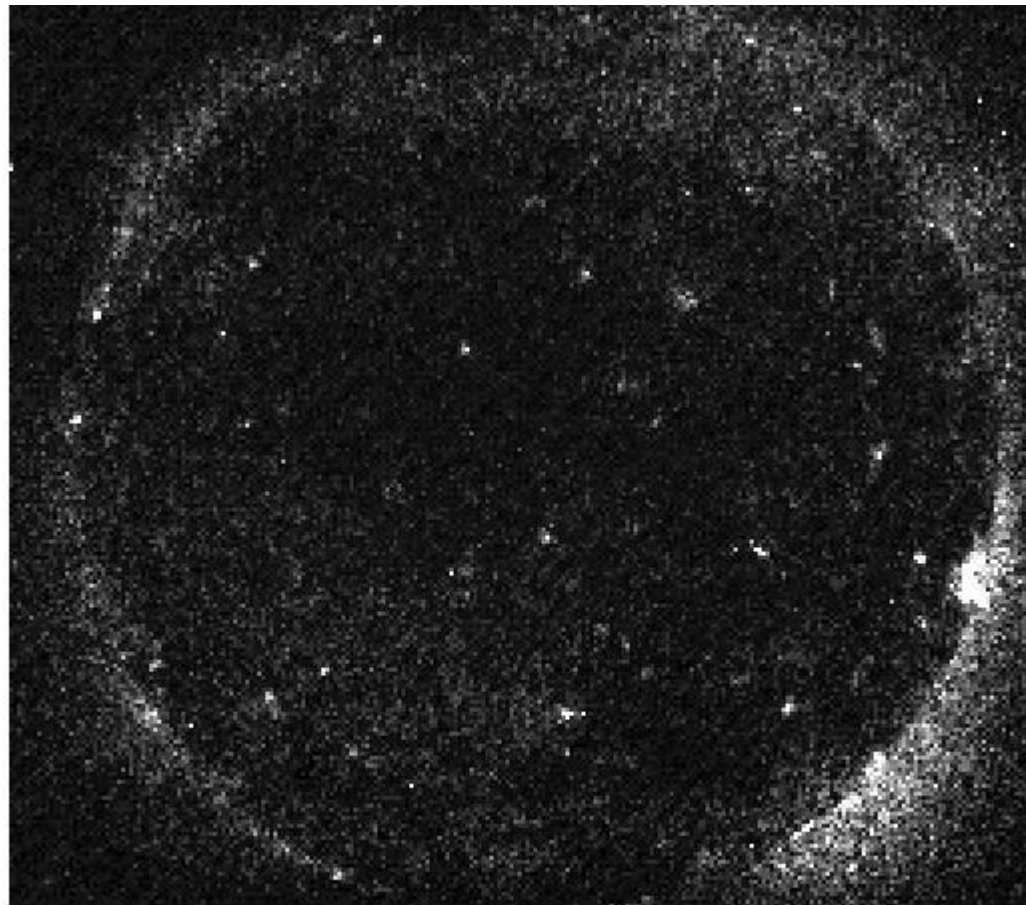NAXIS =   2 /
NAXIS1 =   256 /
NAXIS2 =   256 /
EXTEND =   T /Extensions may be present
EXPOSURE=   11.5725 /exposure time [s]
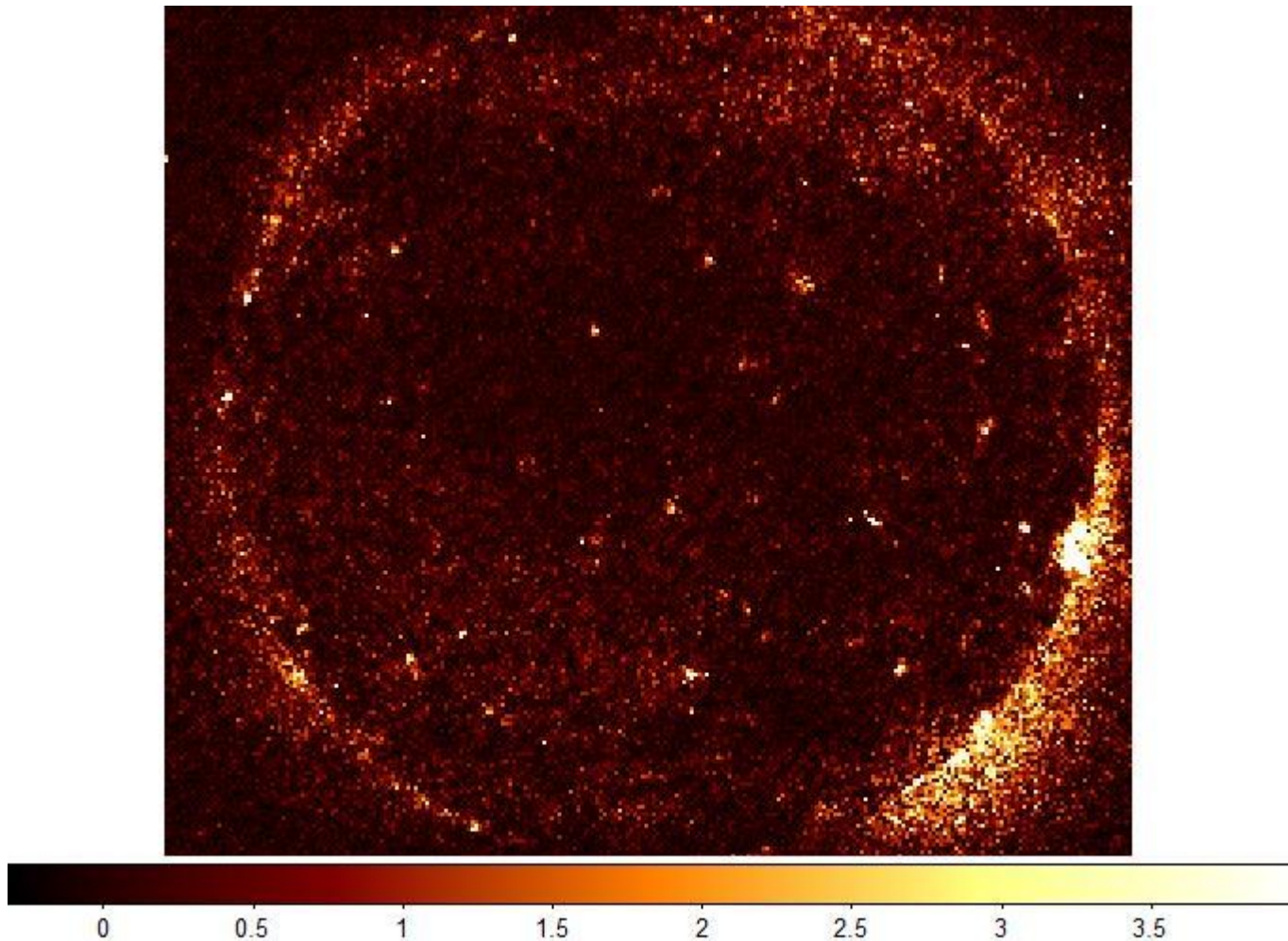 DATE_OBS=   '2008-07-26T00:00:01.653'
/observation start time

Solar Dataset

- For example: xrt_000_Be_med_Open.fits

Solar Dataset

- For example: xrt_000_Be_med_Open.fits

Problems

1. The dataset doesn't seem quite fit the previous Solar DEM model.

2. The dataset description is simple, and what do these filters' names mean?

3. The main objective of this dataset?