

Understanding Solar Flare Heating: Week Four Update

BROCK PARKER

DR. CHUNMING ZHU

Background

- Solar Flares
 - Violent release of radiation
 - Related to magnetic field
- Energy
 - Magnetic field reconnection
 - Proportional to footprint

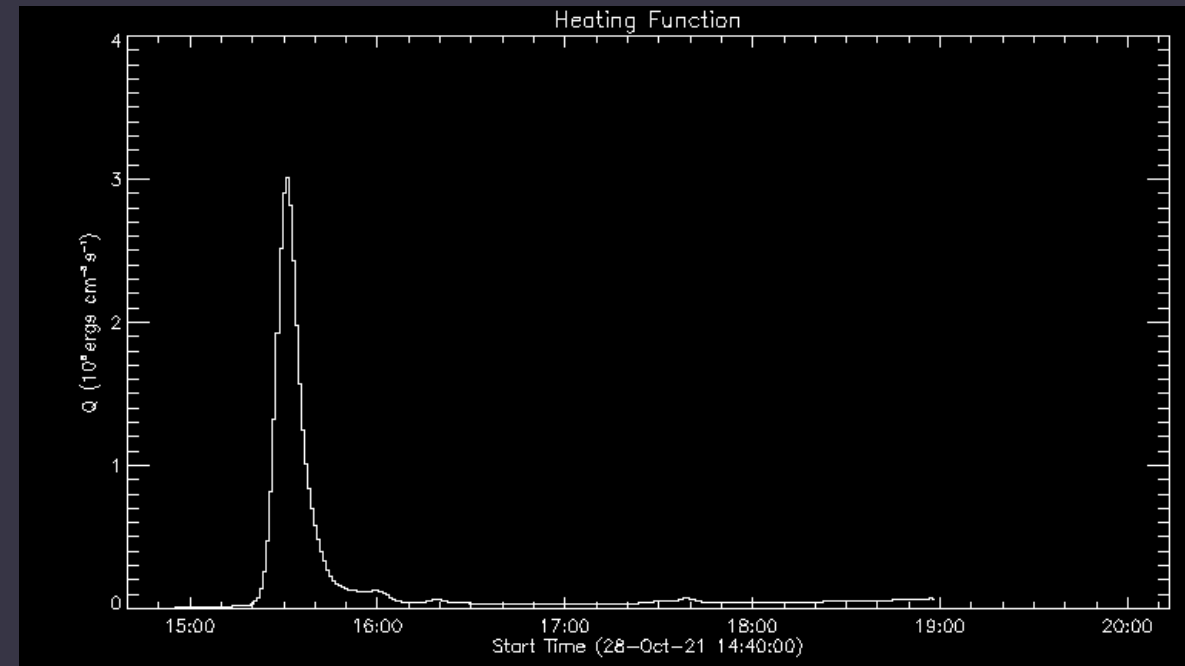
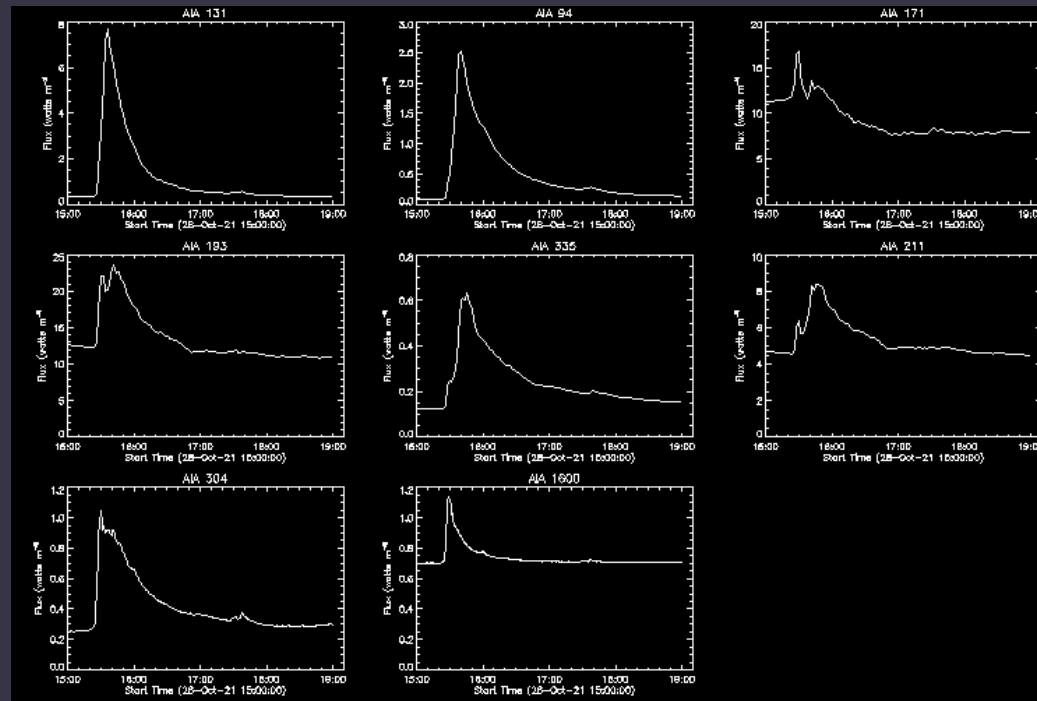
| Goals

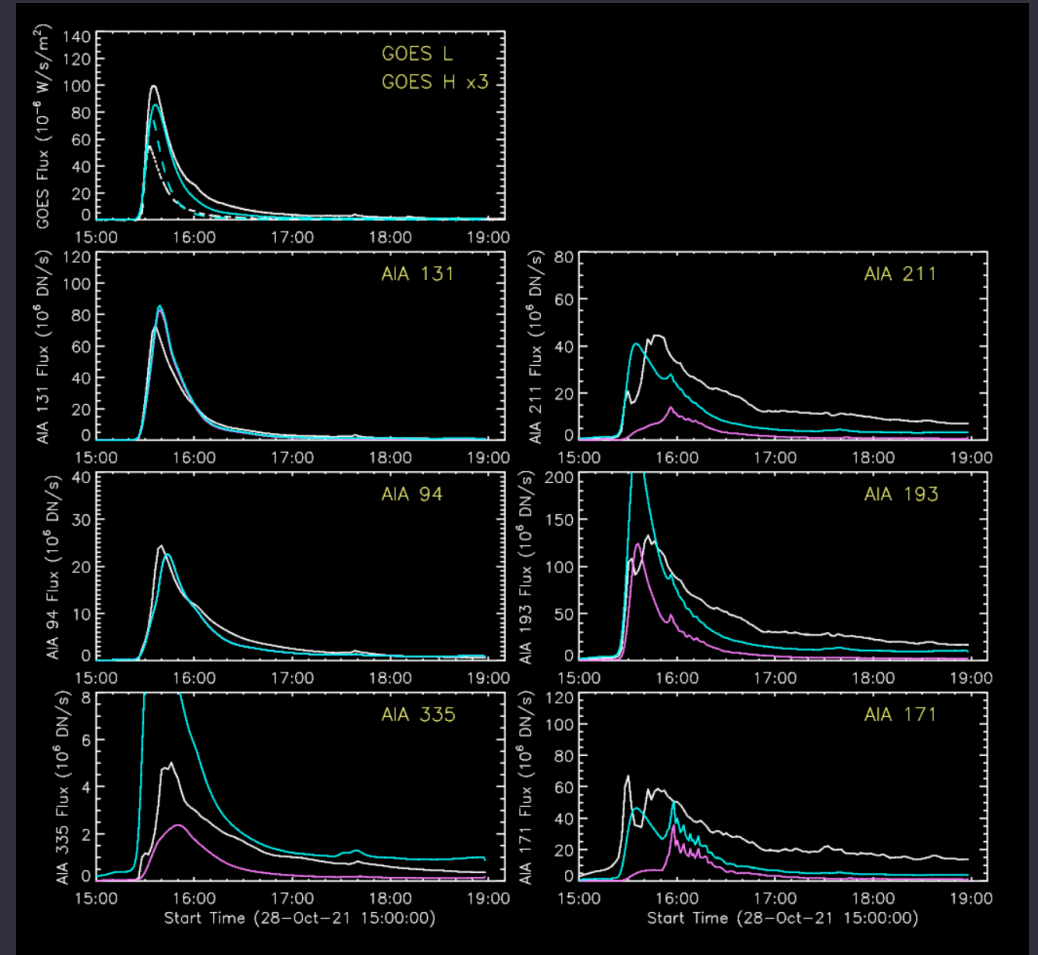
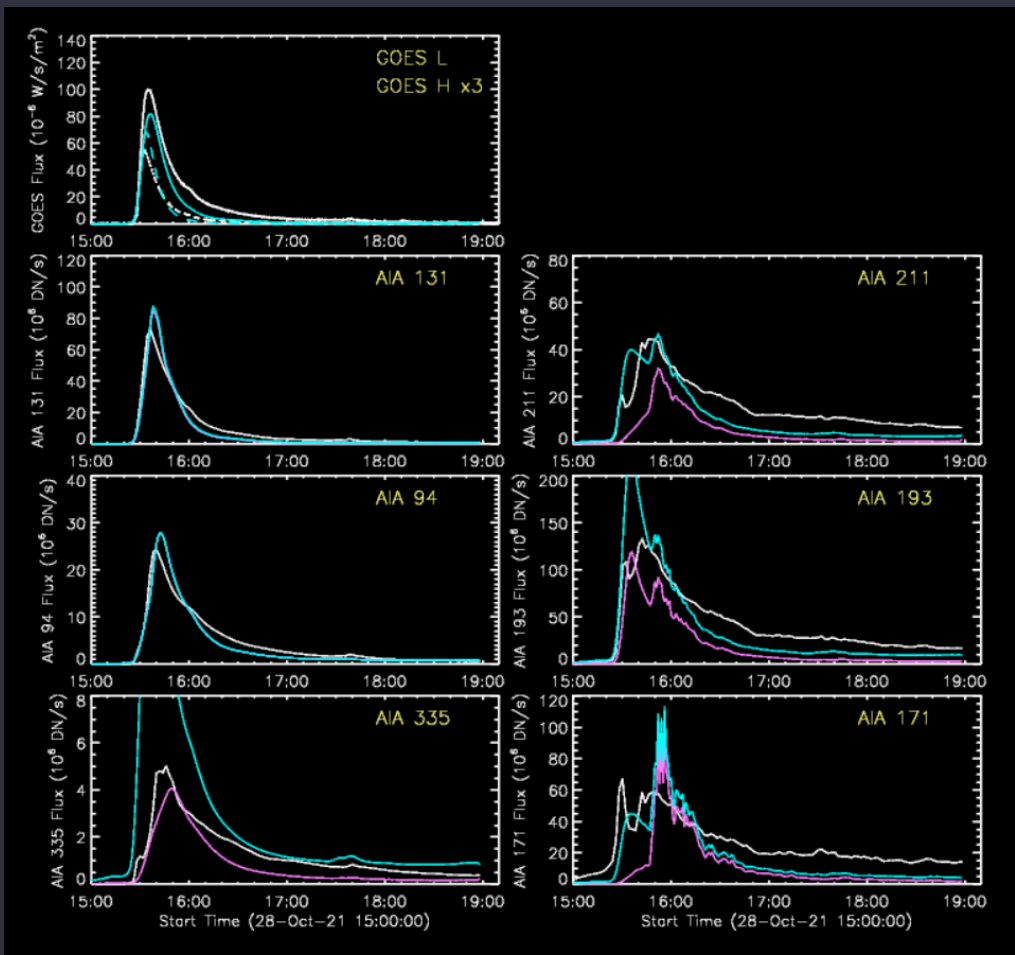
- Model Synthetic Flares
 - Constrain heating functions
 - Flare loop generation
 - Synthetic light curves
 - One flare
- Synthetic Images
 - 0D and 3D combination
 - Formation insight

Process

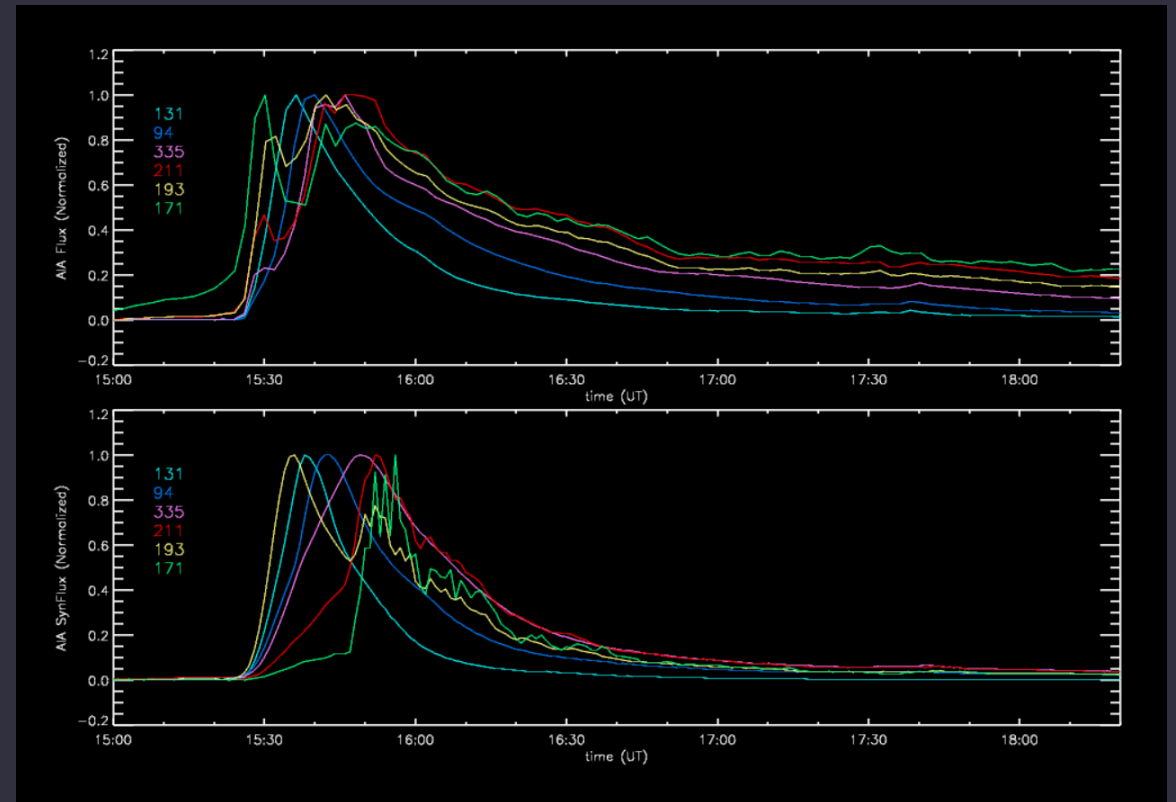
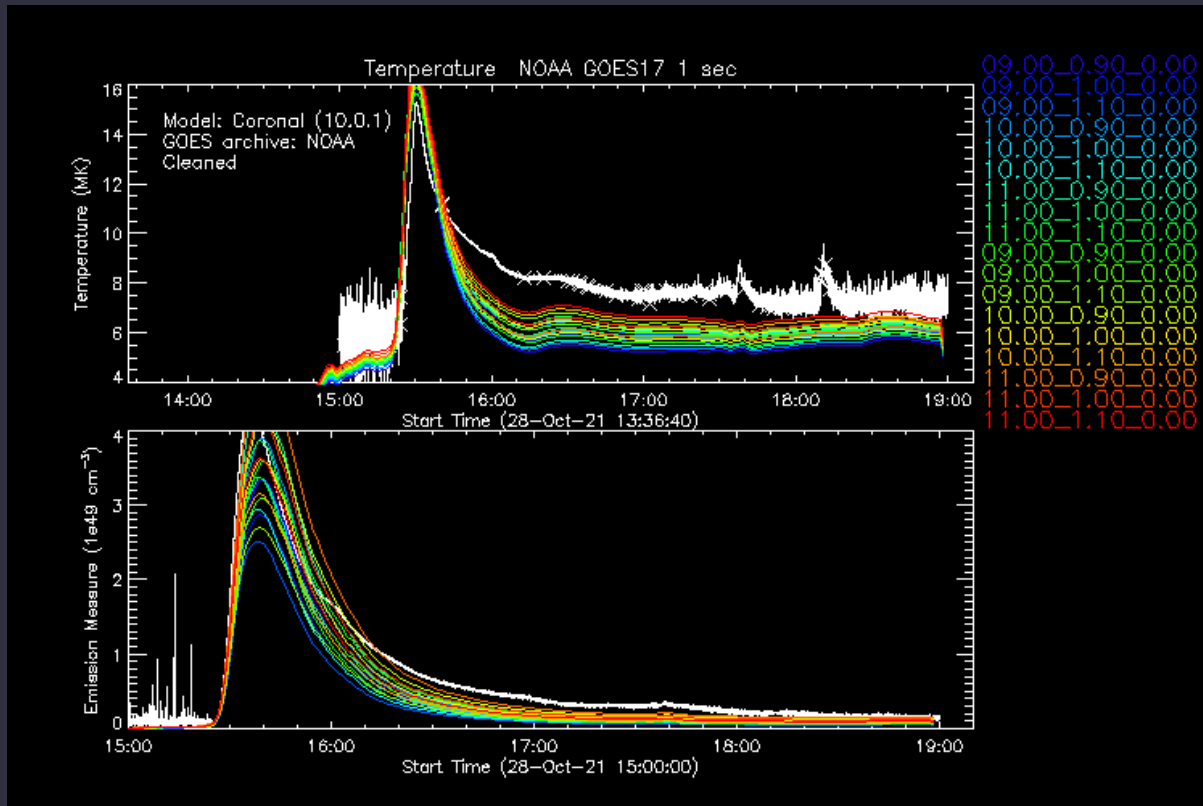
- Download and align data
- Set parameters
- Determine bright pixels
- Generate lightcurves for each separate filter
- Calculate loop lengths
- Calculate the heating function for each
- Run EBTEL - time evolution of density, pressure, and temperature for each loop
- Generate the simulated lightcurves
- Compare to observations
- Combine with EBTEL
- Generate '3d' image of full time evolved loops

Previously Light Curves Heating Functions

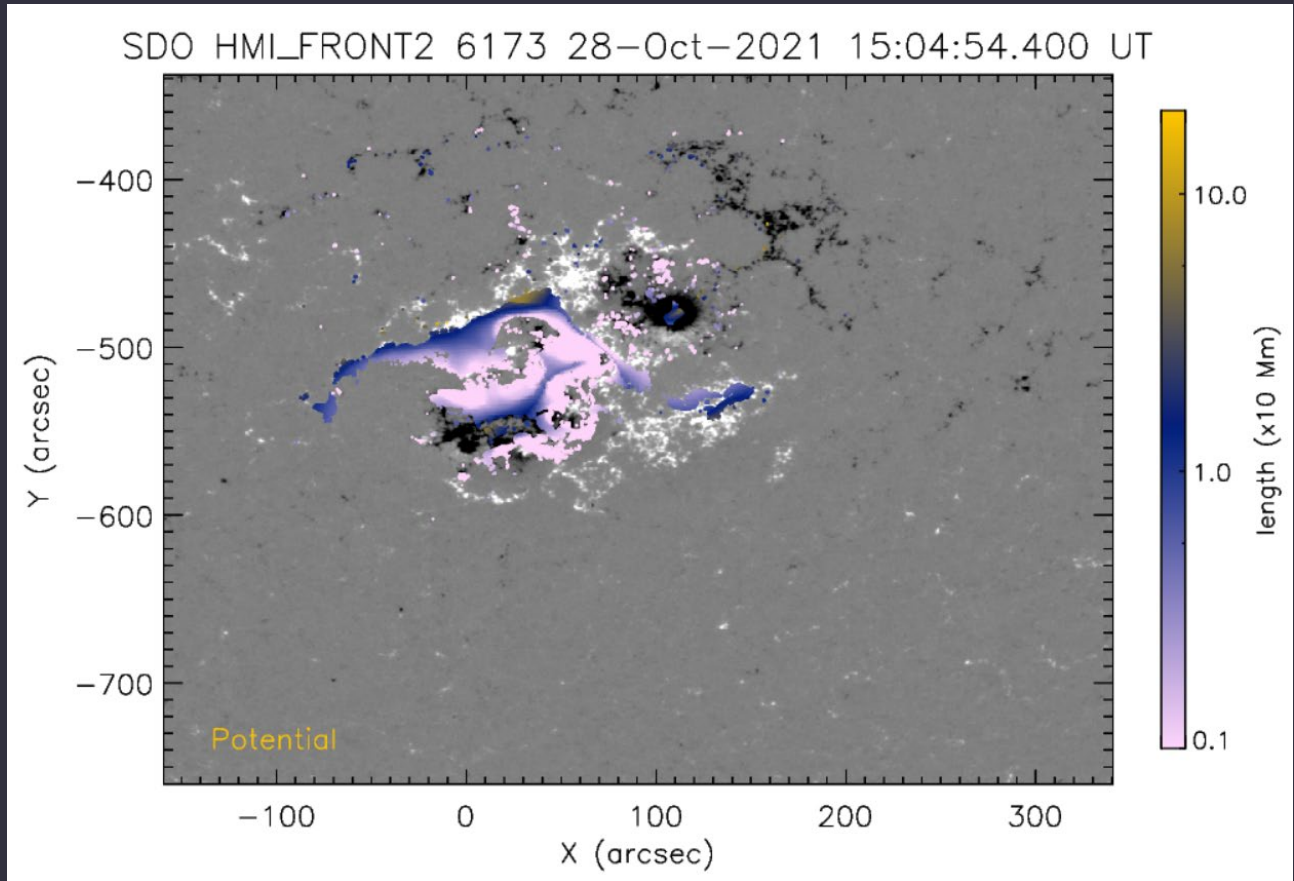
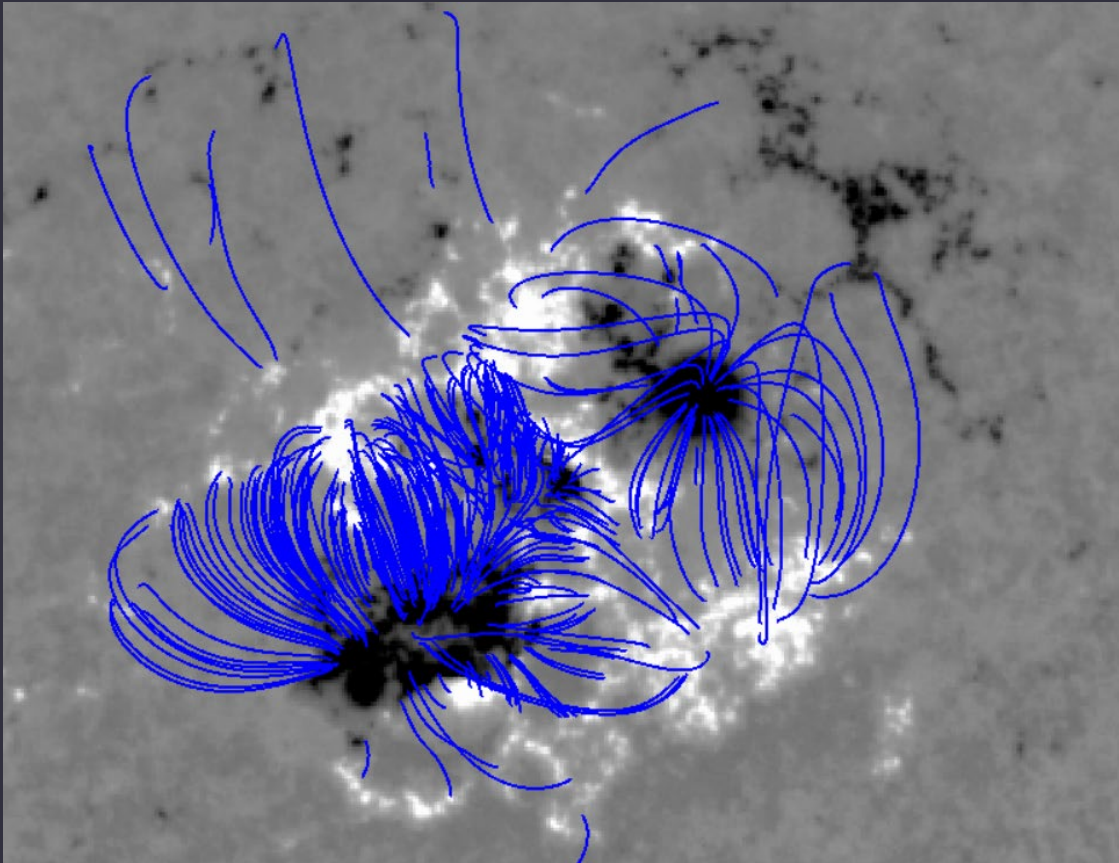




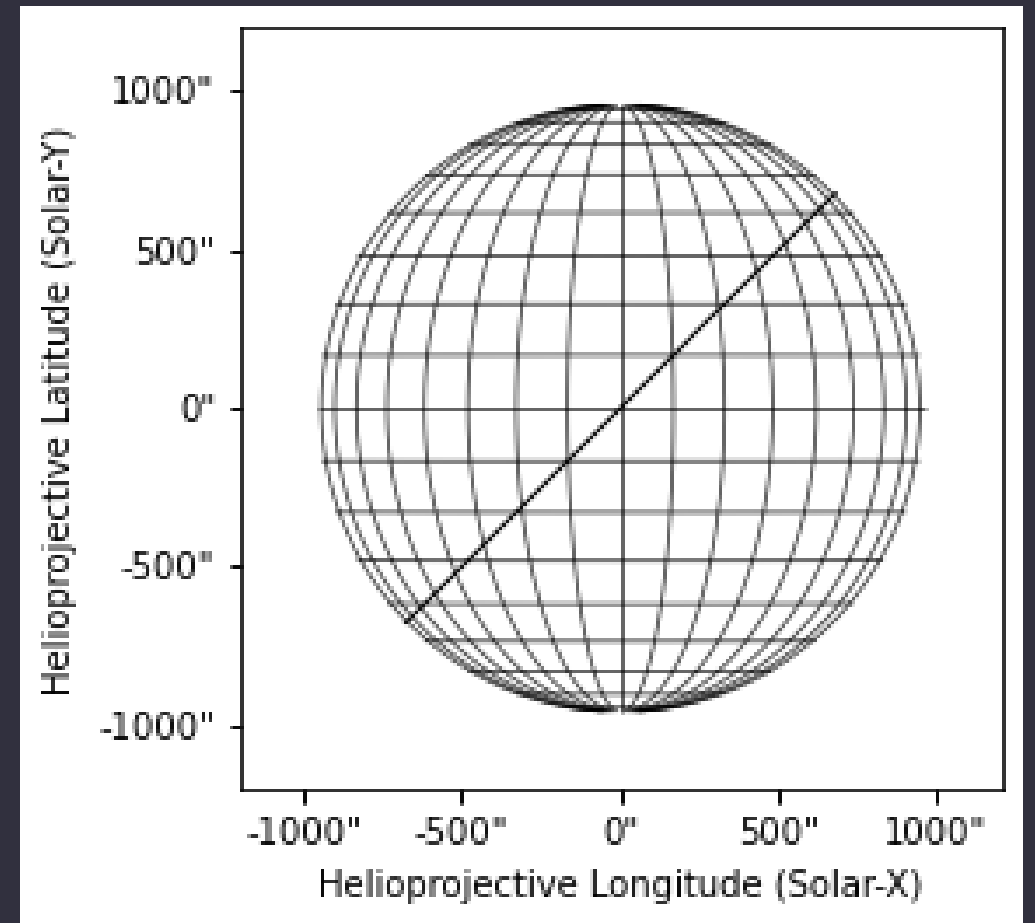
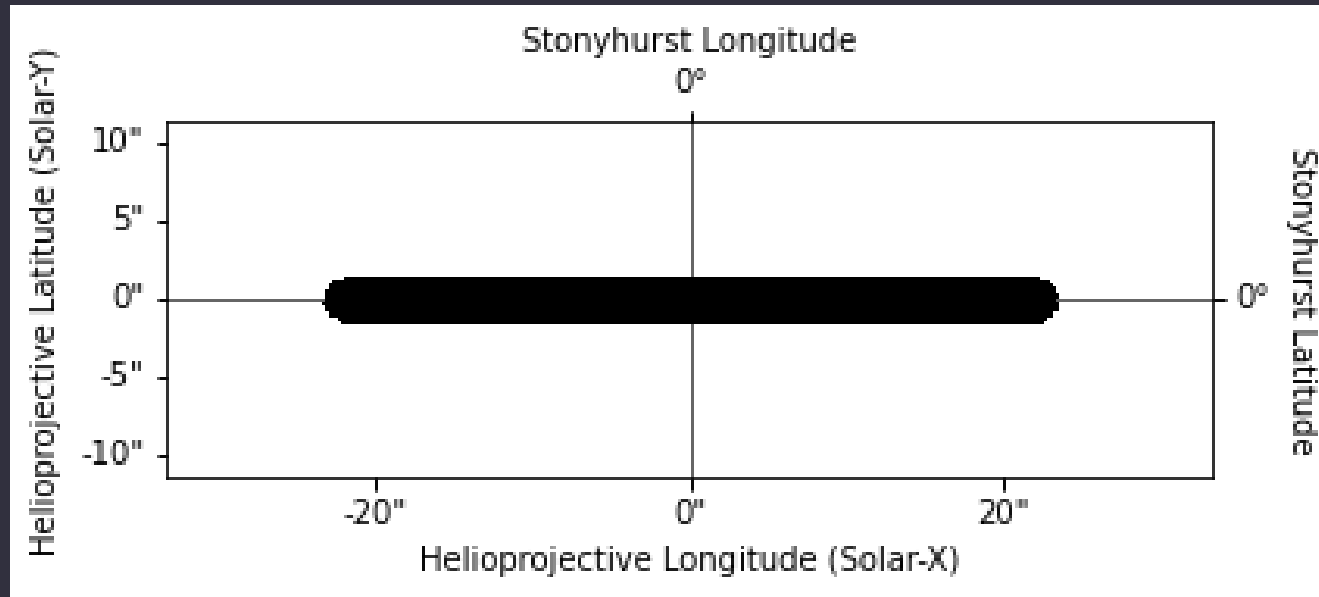
Progress
EBTEL



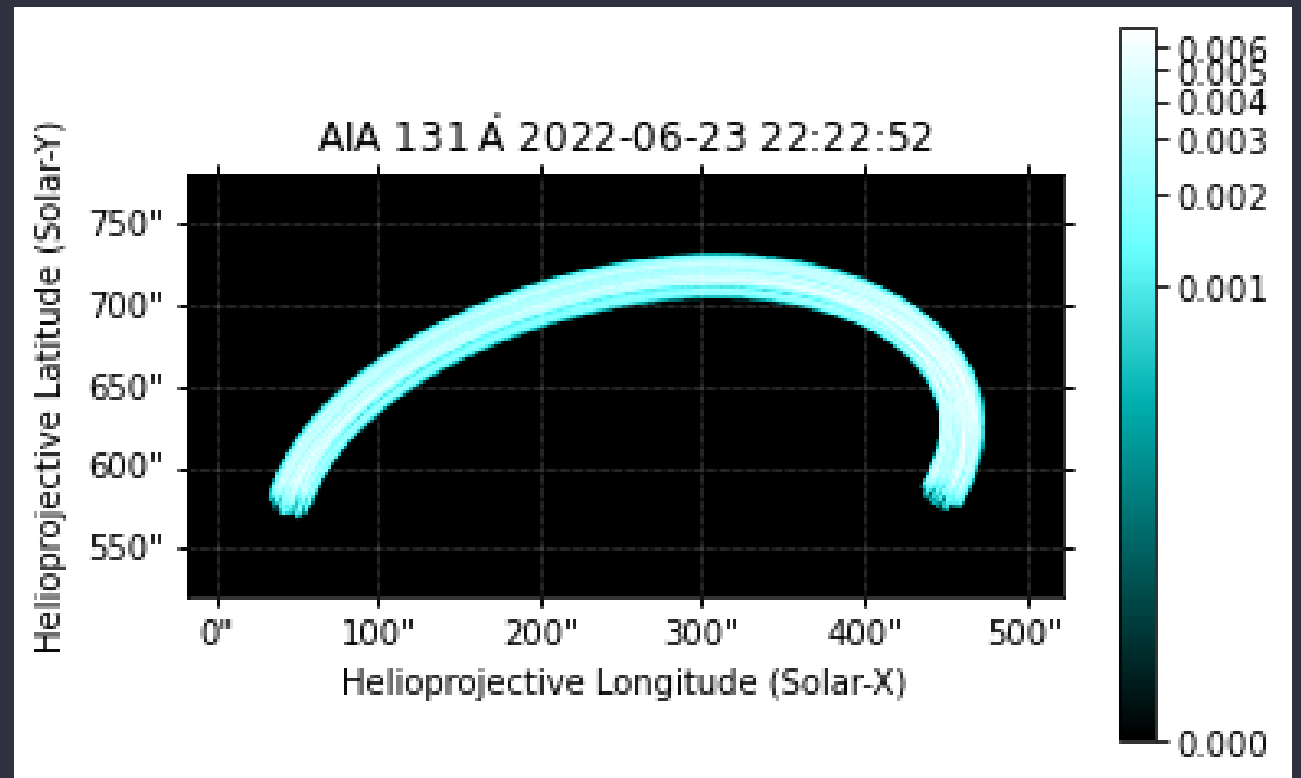
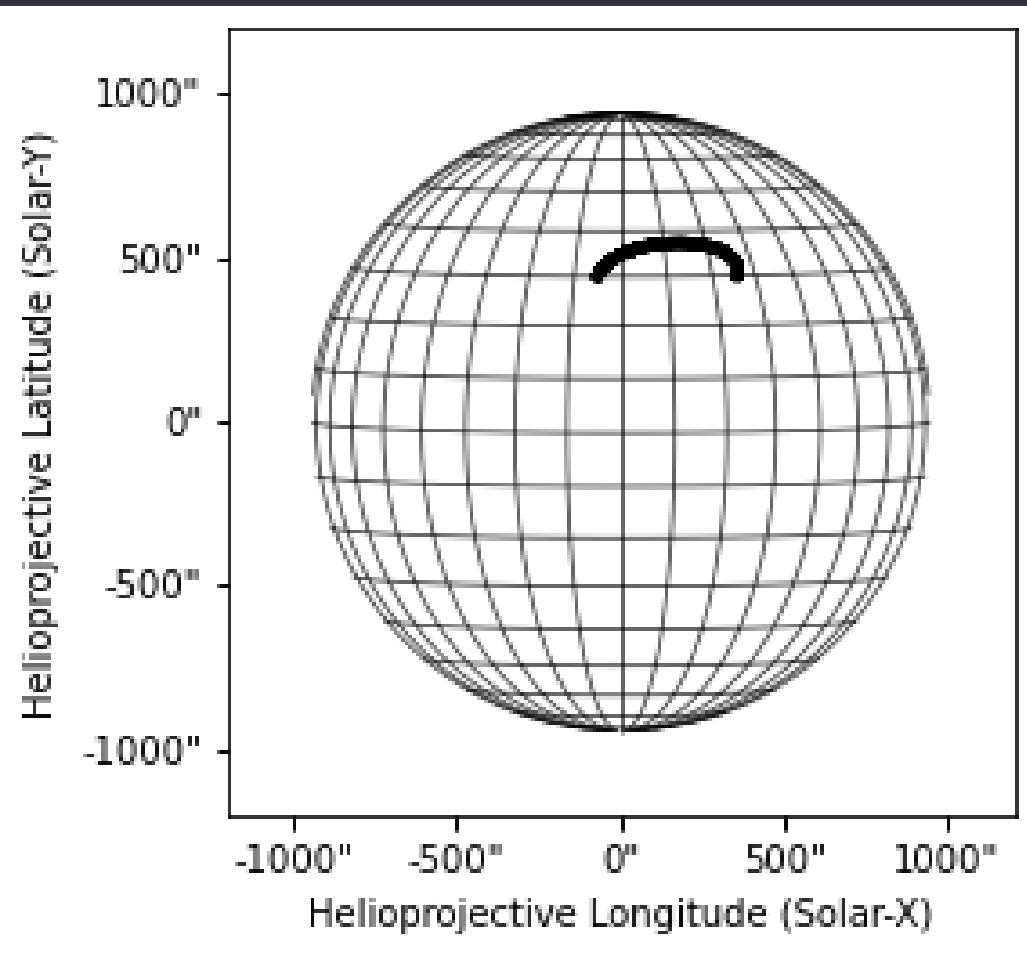
Progress
EBTEL



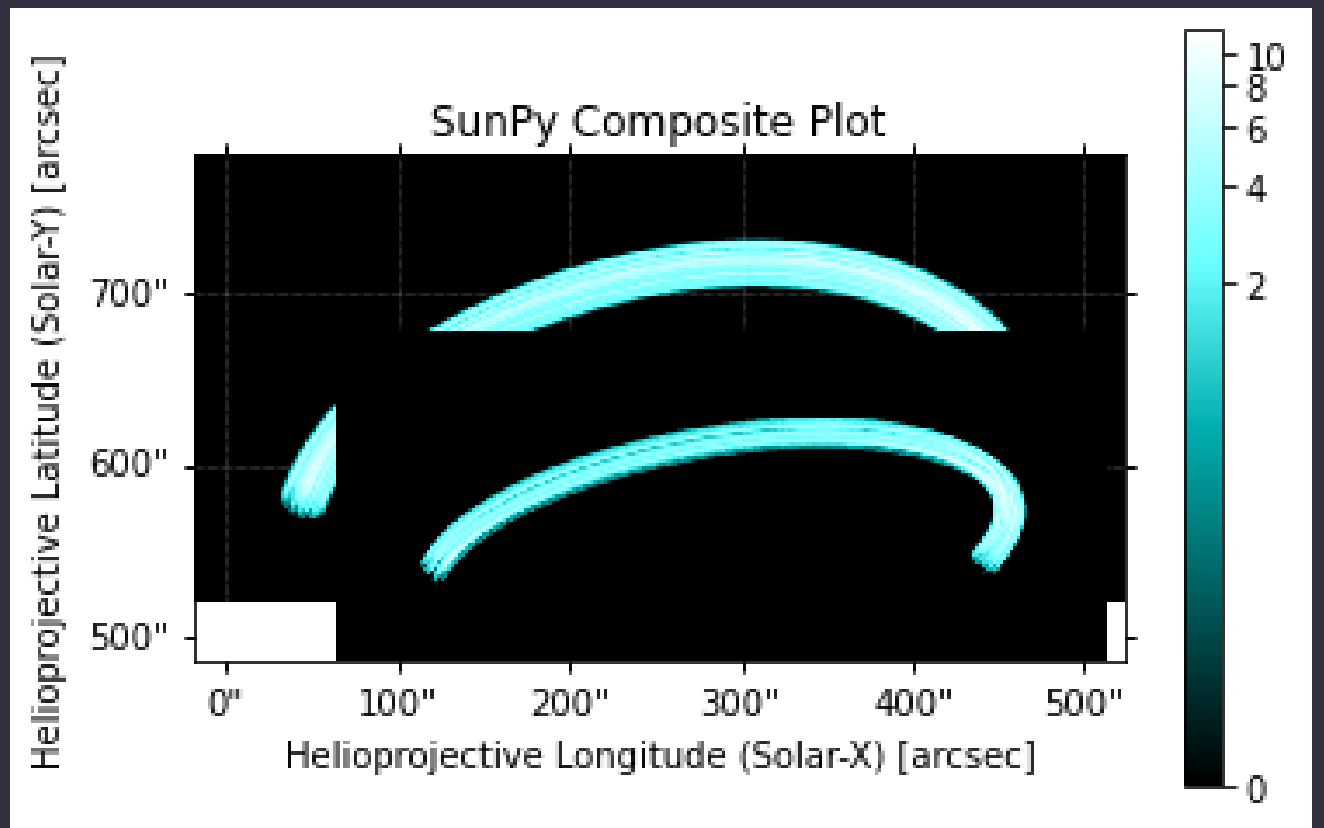
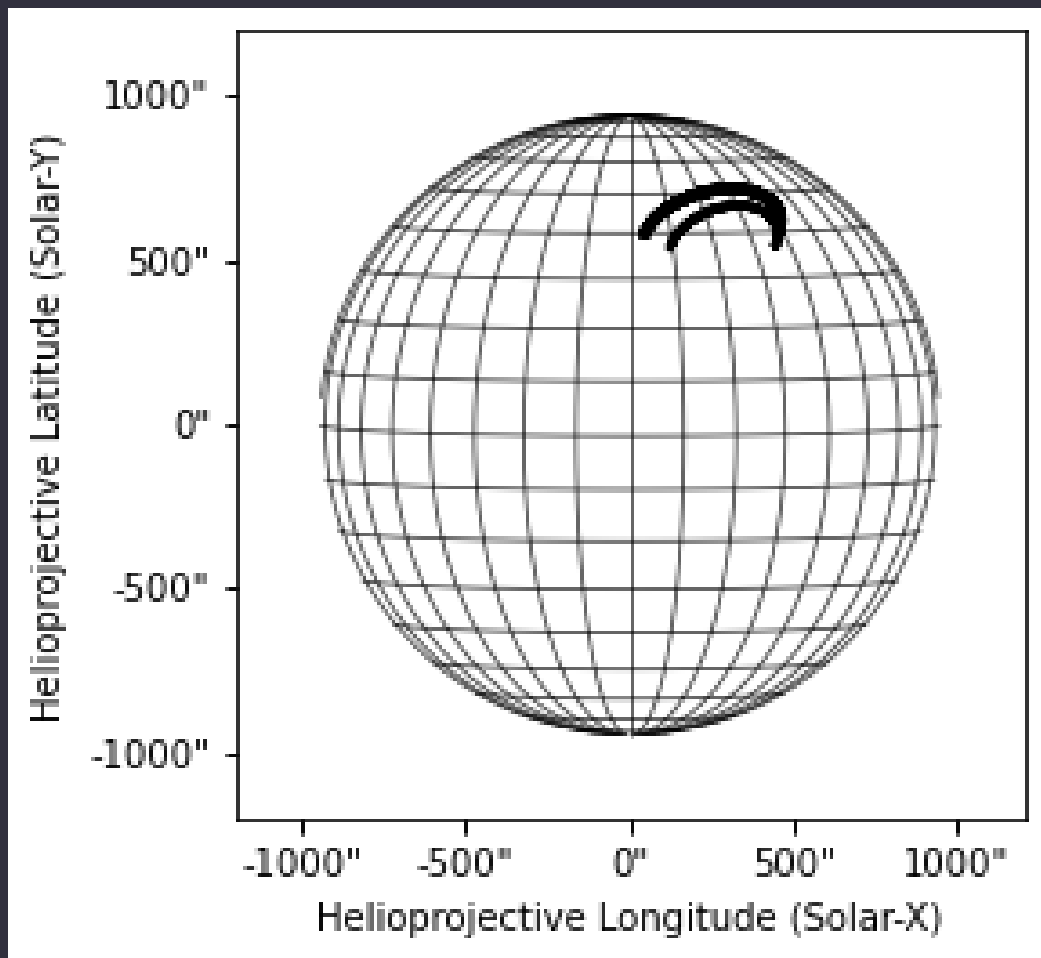
Process
Extrapolation



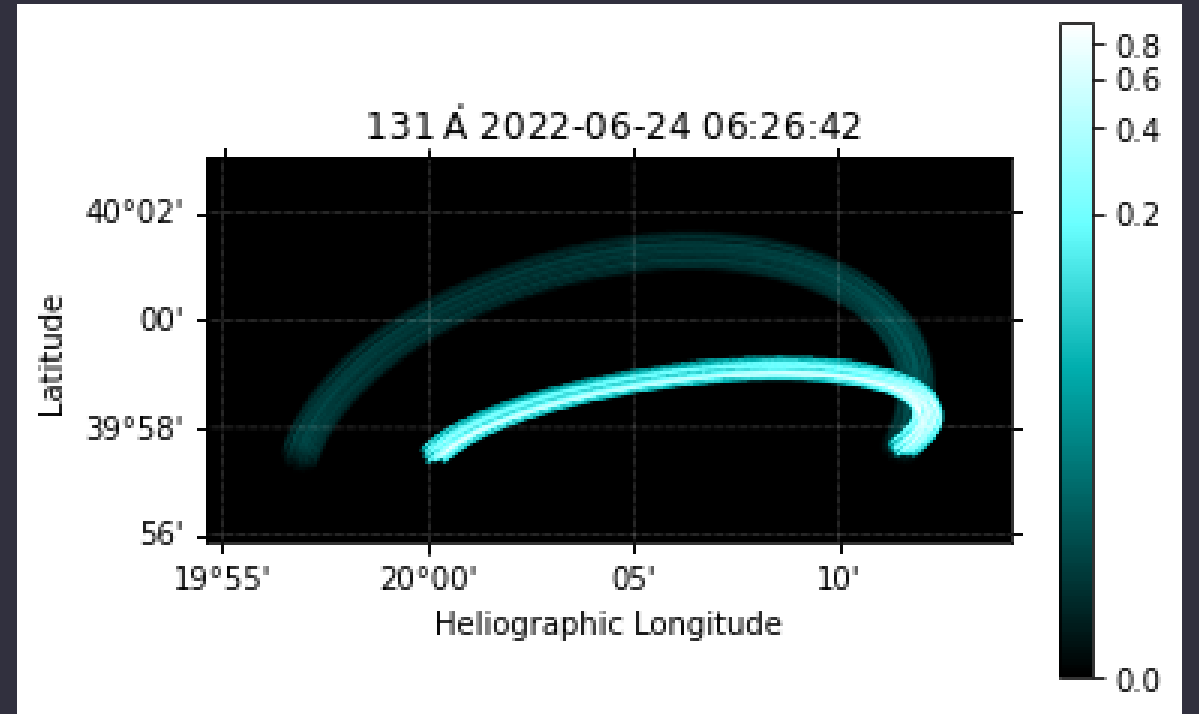
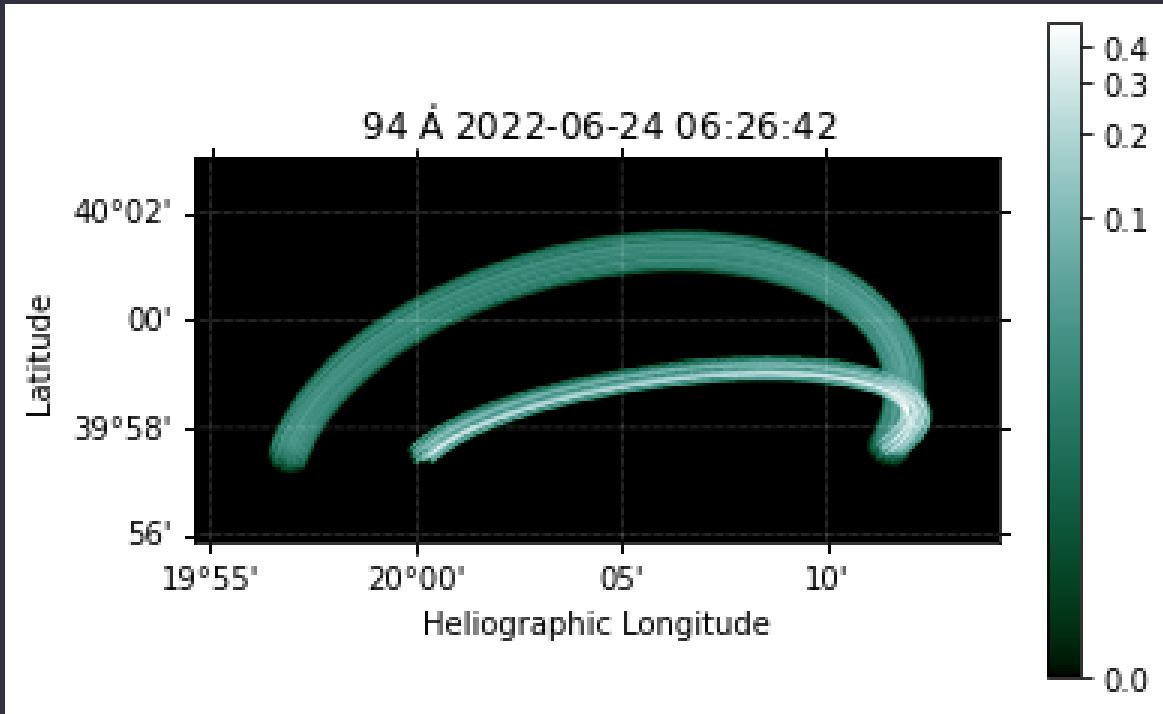
Progress
Simulated Flares



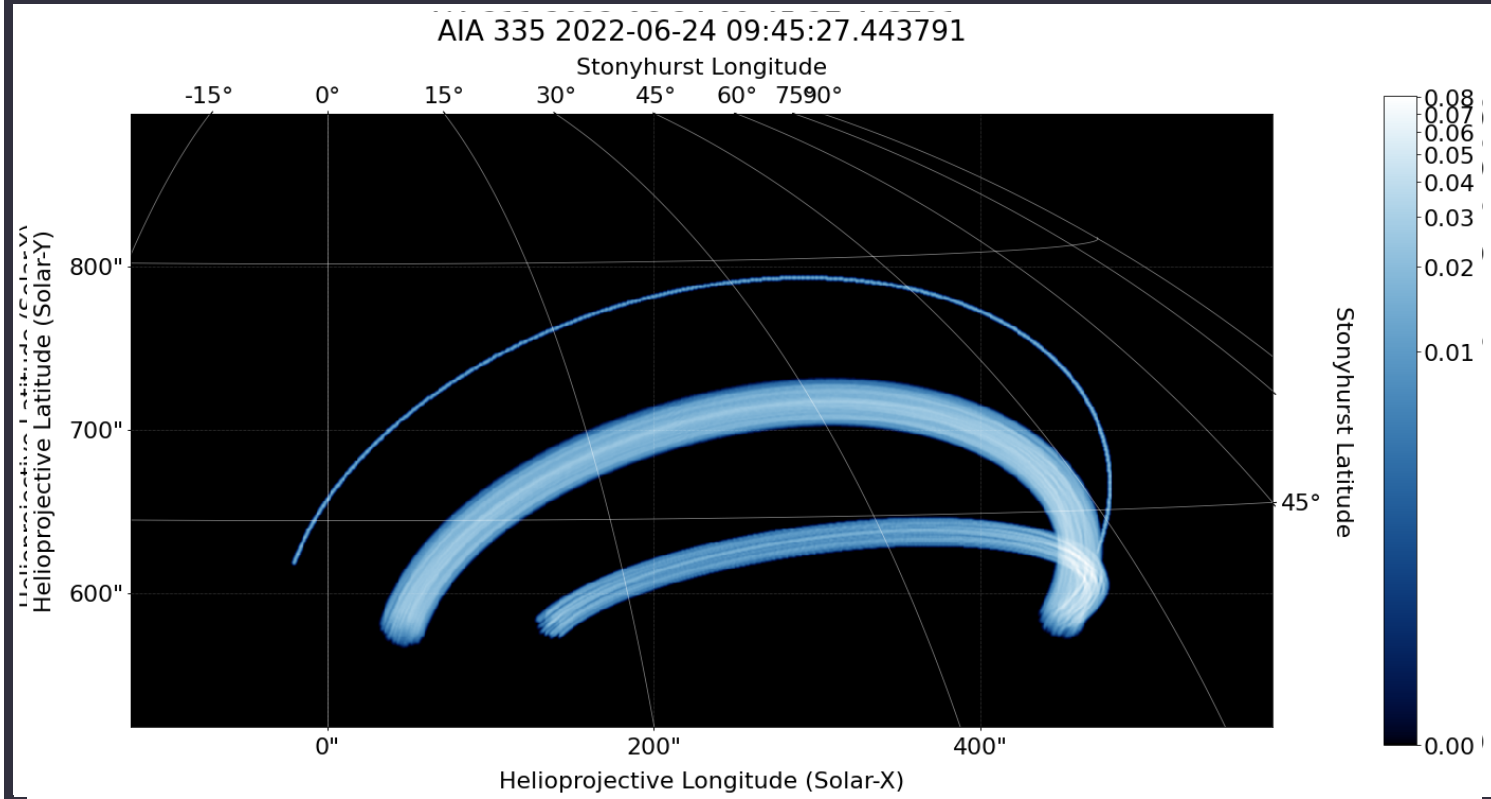
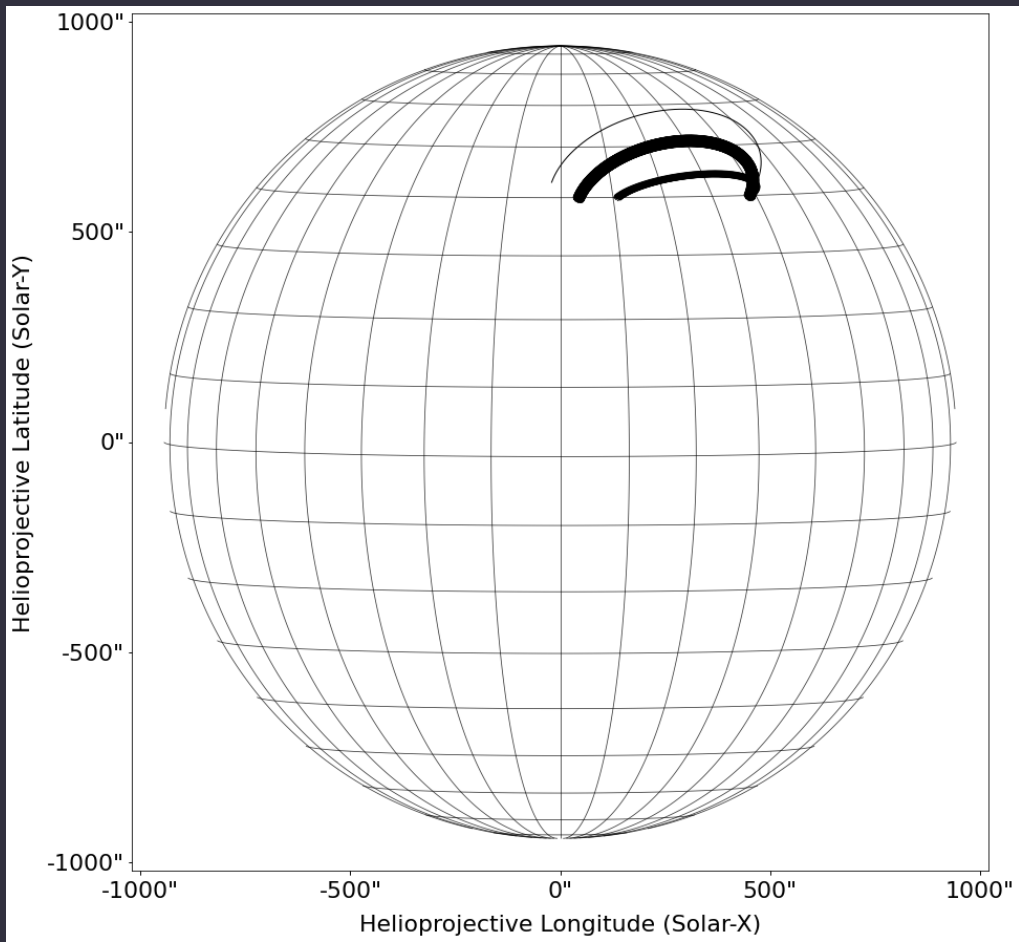
Progress
Simulated Flares



Progress
Simulated Flares



Progress
Simulated Flares



Progress
Simulated Flares

References

- J. A. Klimchuk, et al. 2008, *ApJ*, **682**, 1351.
- Jiong Qui, et al. 2012, *ApJ*, **752**, 124.
- Chunming Zhu, et al. 2018, *ApJ*, **856**, 27.
- W. T. Barnes, et al. 2019, *ApJ*, **880**, 56.