

# Energy Partition of the Flare-CME Events: Week 8

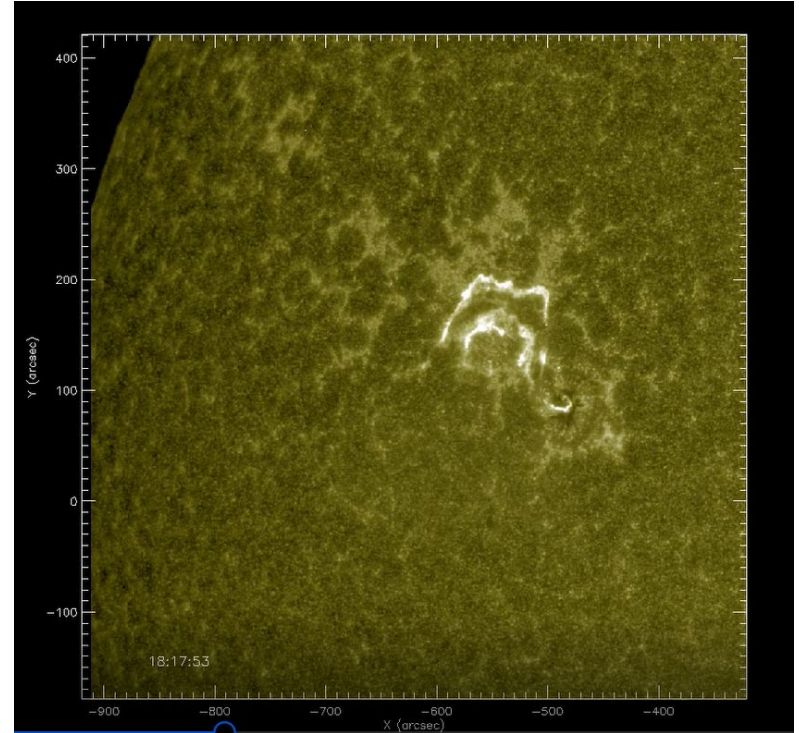
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Advisor: Dr. Chunming Zhu

# Recap

Goal: To find the energy partition of the CME and the flare

Where I left of 2 weeks ago..

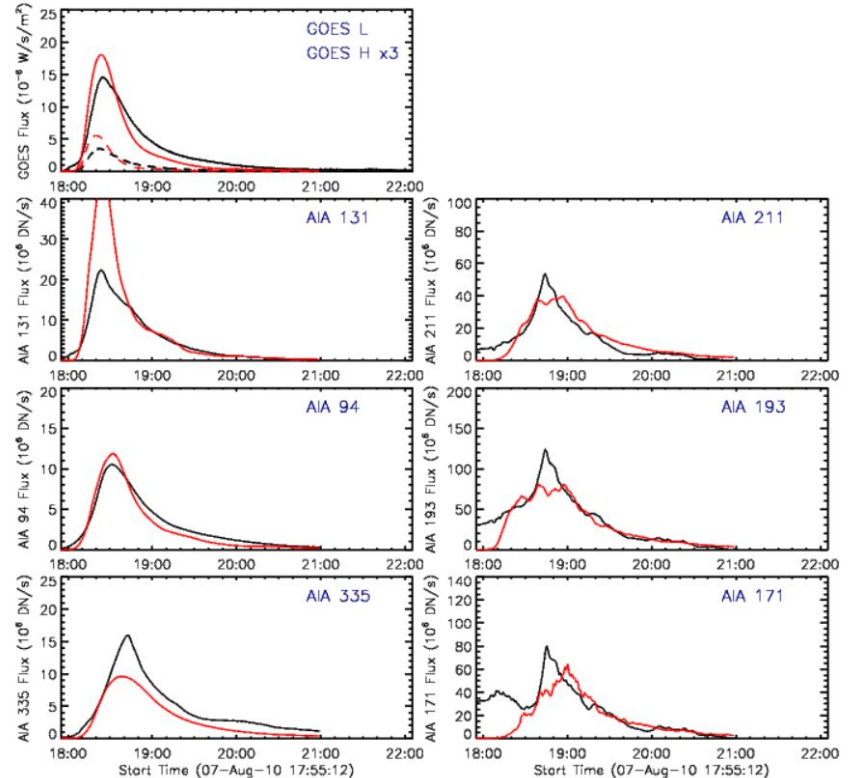
- Testing values for 3 factors used for flare energy calculations





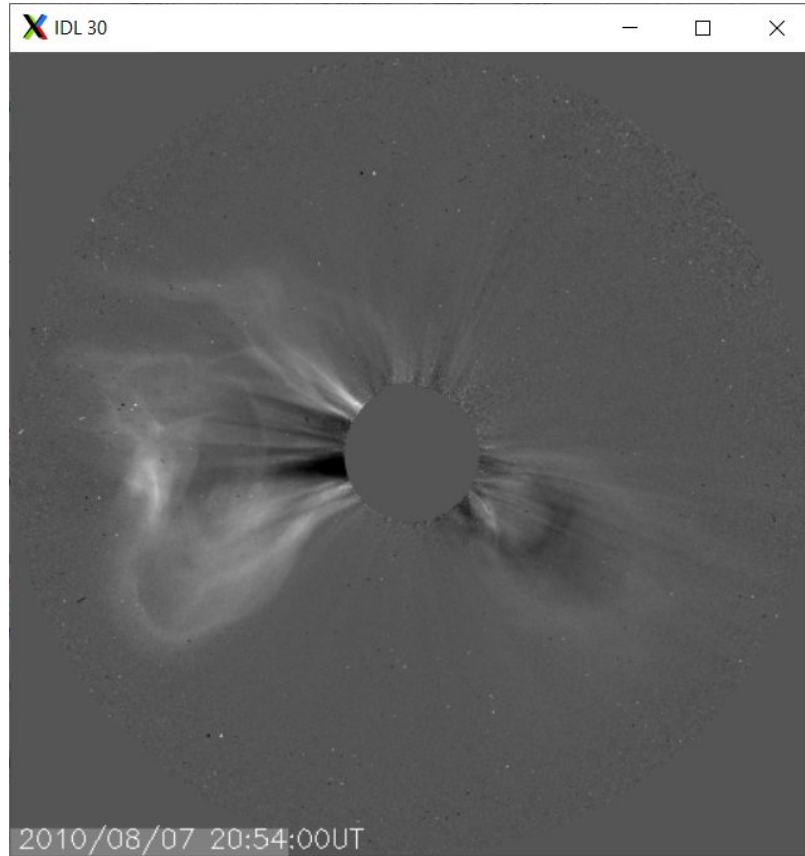
# Synthetic Emission v.s. Observed Lightcurves

- Area method
- Correlation method



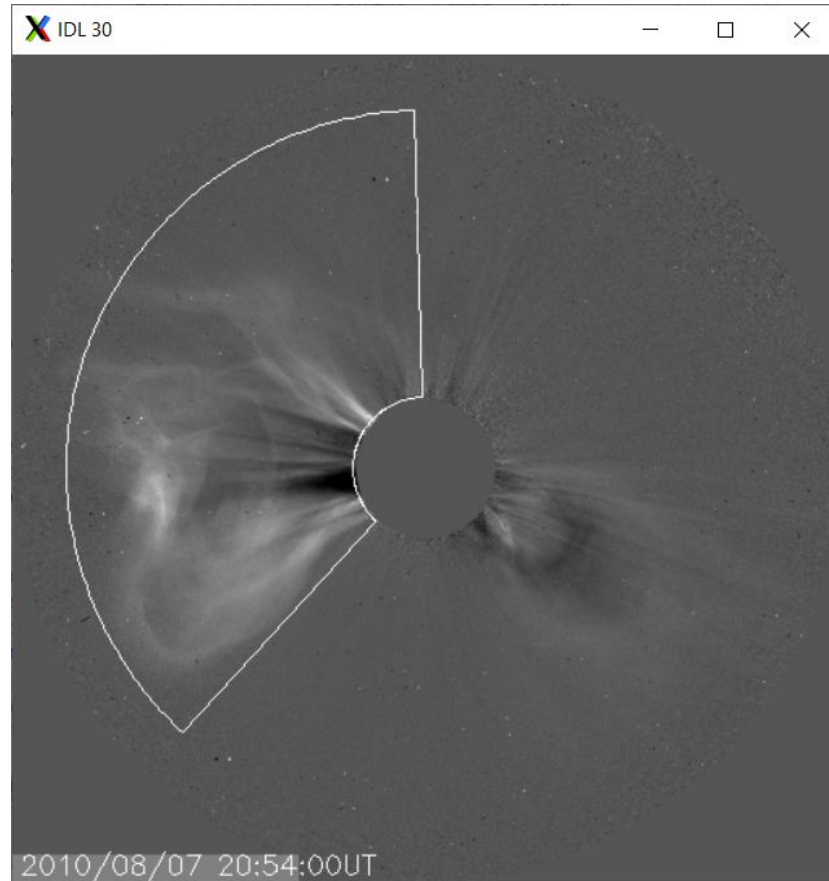


# CME Work



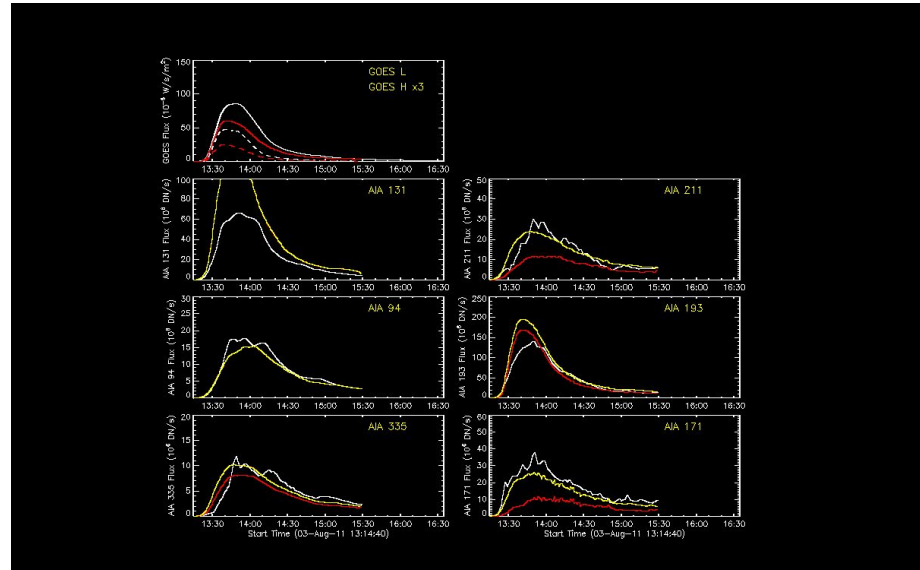


# CME Work

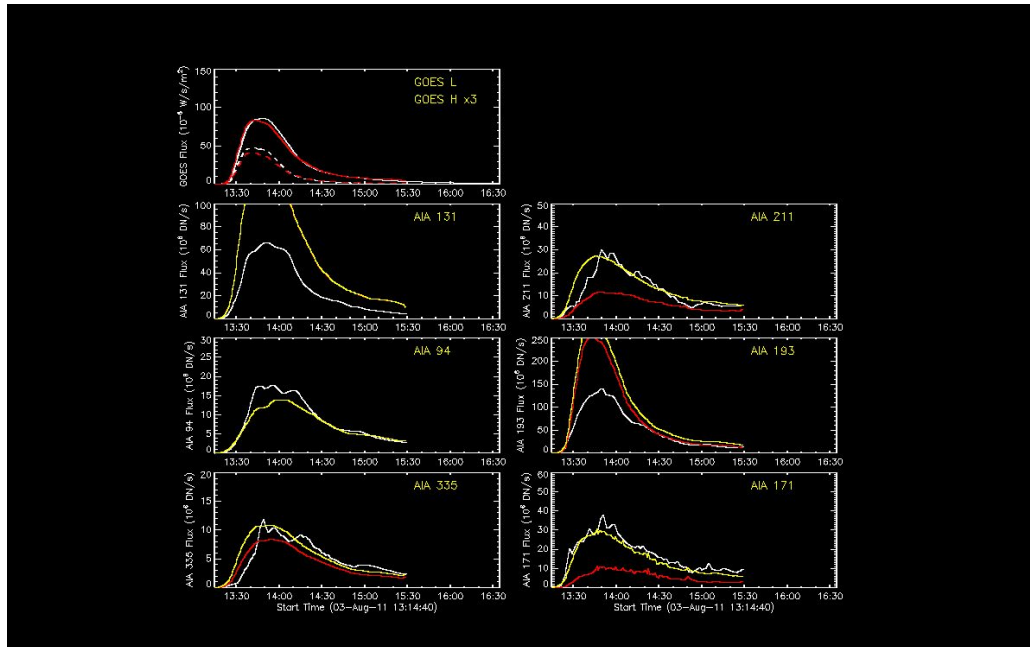


# Method Modifications

- analysis for the best results (two methods combined):
  - scl[0]: mean 1.60909 sdev 0.137510
  - scl[1]: mean 0.763636 sdev 0.0504525
  - scl[2]: mean 0.00000 sdev 0.00000
  - cratio: mean 1.00000 sdev 0.00000
  - glambda: mean 0.509091 sdev 0.144600
  - results for each run:
    - grad\_lambda: 0.50 cratio: 1.00 scales: 1.70\_0.80\_0.00 combined score (corr\*1/diff)= 1.82748
    - grad\_lambda: 0.40 cratio: 1.00 scales: 1.70\_0.80\_0.00 combined score (corr\*1/diff)= 1.81018
    - grad\_lambda: 0.60 cratio: 1.00 scales: 1.50\_0.70\_0.00 combined score (corr\*1/diff)= 1.80392
    - grad\_lambda: 0.50 cratio: 1.00 scales: 1.50\_0.70\_0.00 combined score (corr\*1/diff)= 1.79926
    - grad\_lambda: 0.60 cratio: 1.00 scales: 1.70\_0.80\_0.00 combined score (corr\*1/diff)= 1.78985
    - grad\_lambda: 0.70 cratio: 1.00 scales: 1.50\_0.80\_0.00 combined score (corr\*1/diff)= 1.78202
    - grad\_lambda: 0.30 cratio: 1.00 scales: 1.70\_0.80\_0.00 combined score (corr\*1/diff)= 1.76918
    - grad\_lambda: 0.30 cratio: 1.00 scales: 1.90\_0.80\_0.00 combined score (corr\*1/diff)= 1.73623
    - grad\_lambda: 0.40 cratio: 1.00 scales: 1.50\_0.70\_0.00 combined score (corr\*1/diff)= 1.72555
    - grad\_lambda: 0.70 cratio: 1.00 scales: 1.50\_0.70\_0.00 combined score (corr\*1/diff)= 1.72078



# Method Modifications





# Upcoming Work

- Finish testing values on all 6 flare events
- Calculated the total heating and radiation losses based on the factors chosen
- Get the kinetic and mechanical energies of the corresponding CMEs
- Study the energy partitions
  - Flare v.s. CME
  - Radiation loss proportion
  - Mechanical energy proportion



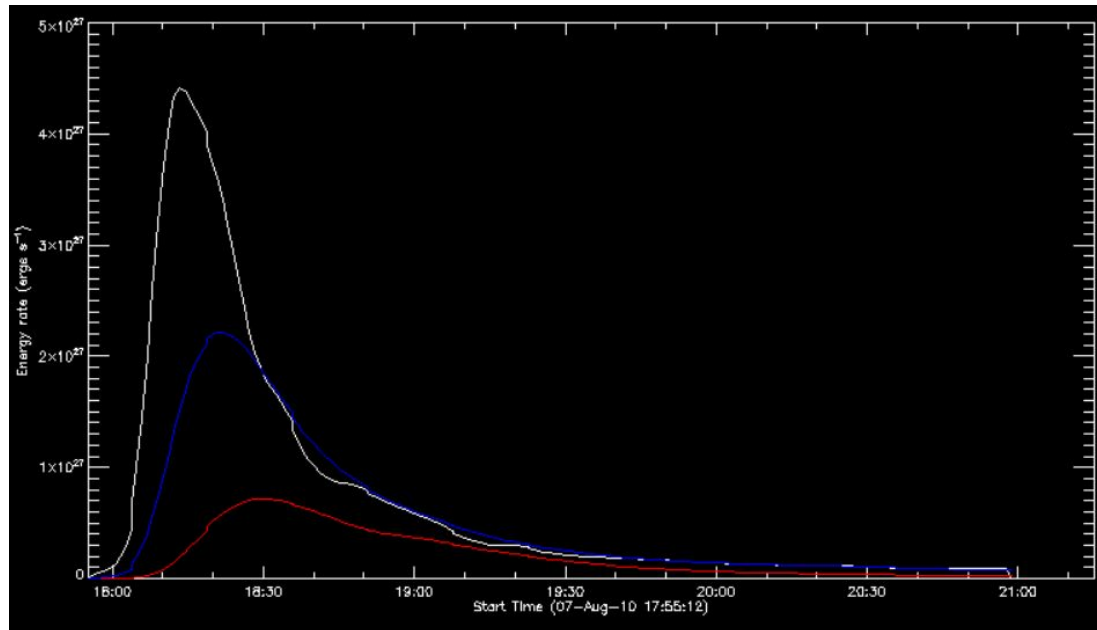


# Image Sources

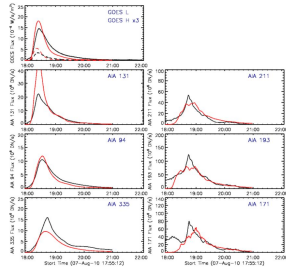
<https://vectorforfree.com/product/smm-people-vector-2/>



# Upcoming Work



# Flare Work



- analysis for the best results (two methods combined):
  - sc[0]: mean 1.60969 sdev 0.137510
  - sc[1]: mean 0.703639 sdev 0.056425
  - sc[2]: mean 0.00000 sdev 0.00000
  - cratio: mean 1.00000 sdev 0.00000
  - giambda: mean 0.500991 sdev 0.144600
- Results for each run:
  - grad\_lambda: 0.00 cratio: 1.00 scales: 1.70\_0.80\_0.00 combined score (corr1:diff): 5.82748
  - grad\_lambda: 0.40 cratio: 1.00 scales: 1.70\_0.80\_0.00 combined score (corr1:diff): 5.81018
  - grad\_lambda: 0.60 cratio: 1.00 scales: 1.50\_0.70\_0.00 combined score (corr1:diff): 5.80392
  - grad\_lambda: 0.60 cratio: 1.00 scales: 1.70\_0.70\_0.00 combined score (corr1:diff): 5.79928
  - grad\_lambda: 0.60 cratio: 1.00 scales: 1.70\_0.80\_0.00 combined score (corr1:diff): 5.79888
  - grad\_lambda: 0.70 cratio: 1.00 scales: 1.50\_0.80\_0.00 combined score (corr1:diff): 5.78202
  - grad\_lambda: 0.30 cratio: 1.00 scales: 1.70\_0.80\_0.00 combined score (corr1:diff): 5.76918
  - grad\_lambda: 0.30 cratio: 1.00 scales: 1.90\_0.80\_0.00 combined score (corr1:diff): 5.73628
  - grad\_lambda: 0.40 cratio: 1.00 scales: 1.50\_0.70\_0.00 combined score (corr1:diff): 1.72555
  - grad\_lambda: 0.70 cratio: 1.00 scales: 1.50\_0.70\_0.00 combined score (corr1:diff): 1.72078

