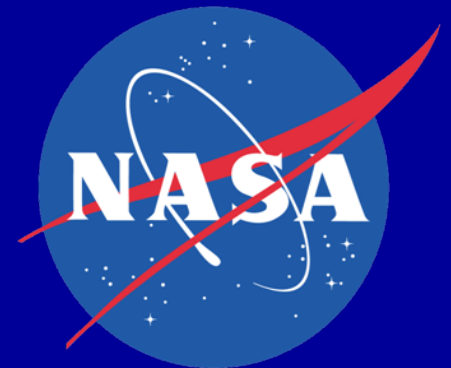


Enhancement and Identification of Faint Features in STEREO COR1 Images

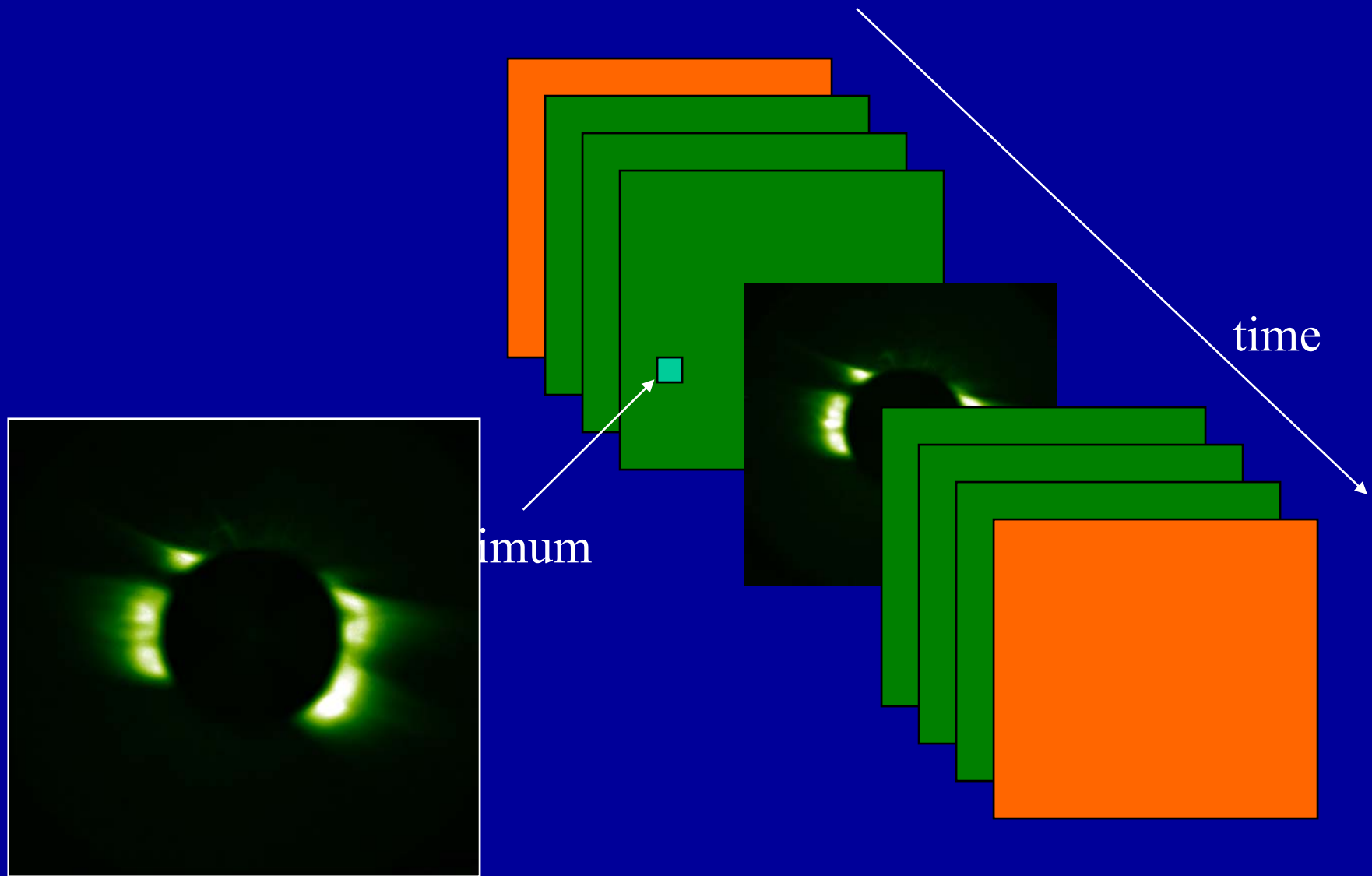
Shaela I. Jones, Joe Davila



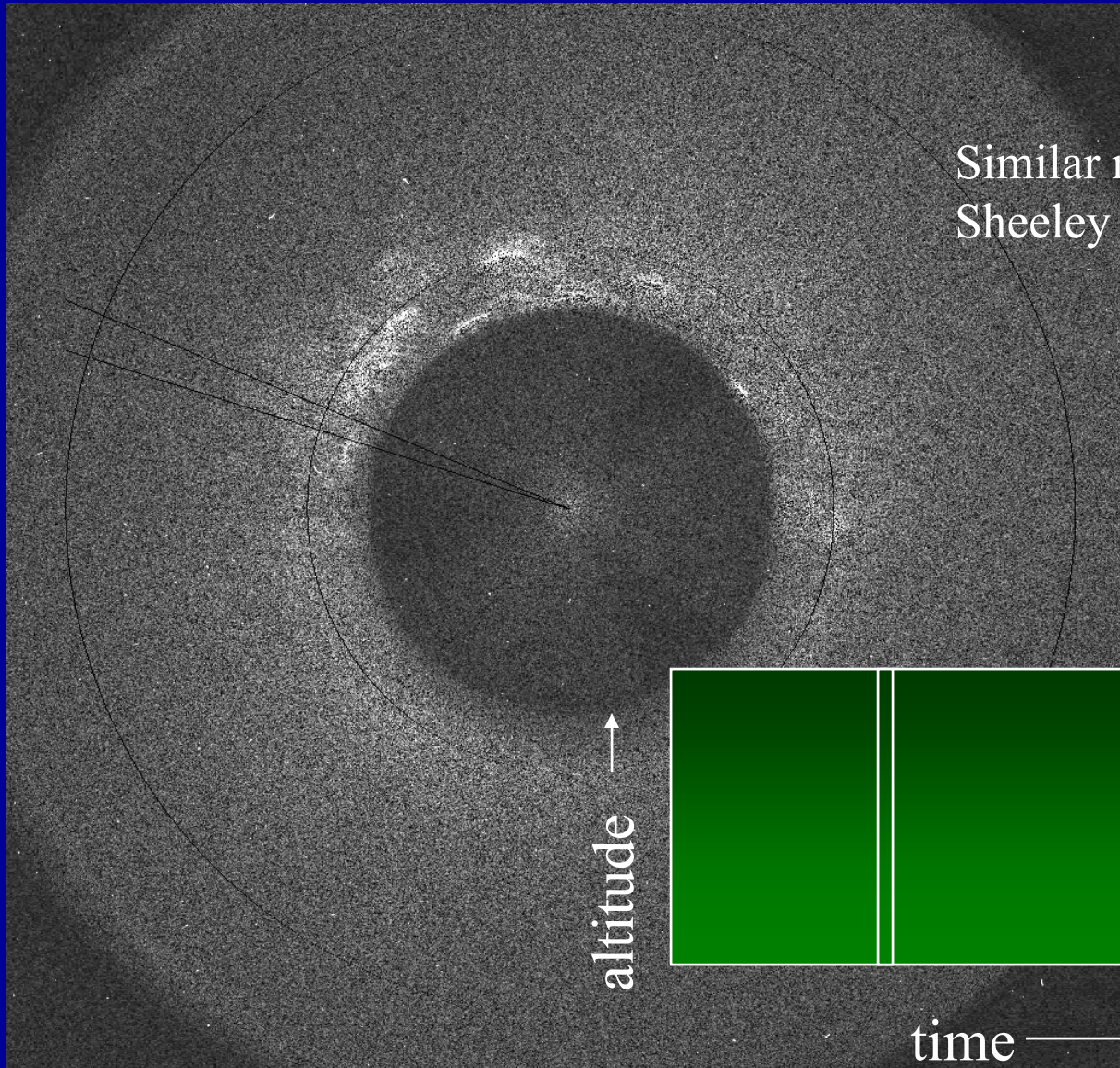
Faint Features

- Unresolved material
- Not generally visible in individual frames
- Seen in many coronagraph difference movies, including COR1
- Related to inhomogeneities in slow solar wind?
- How can we enhance images to reveal moving material?

Image Differencing Method



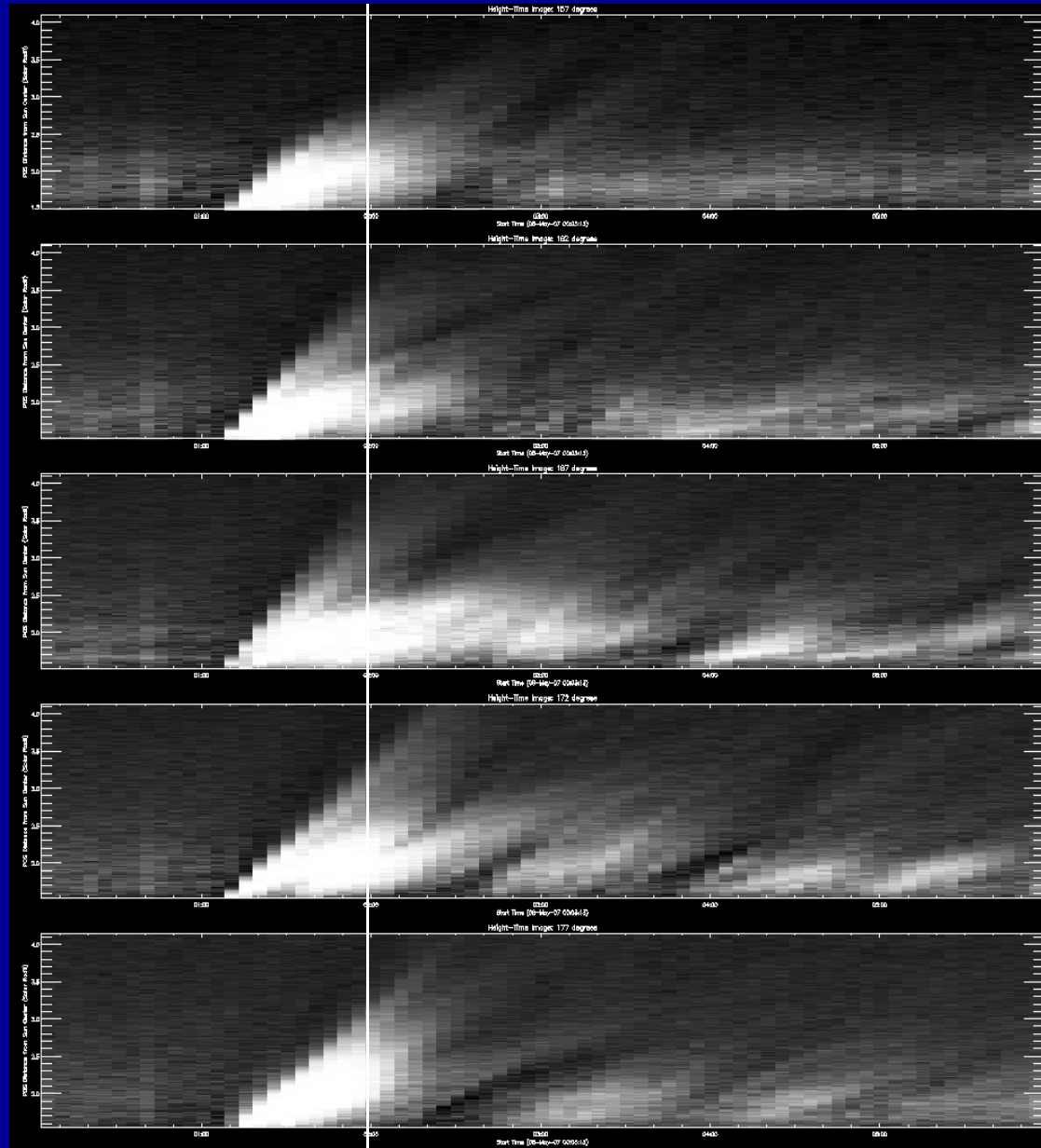
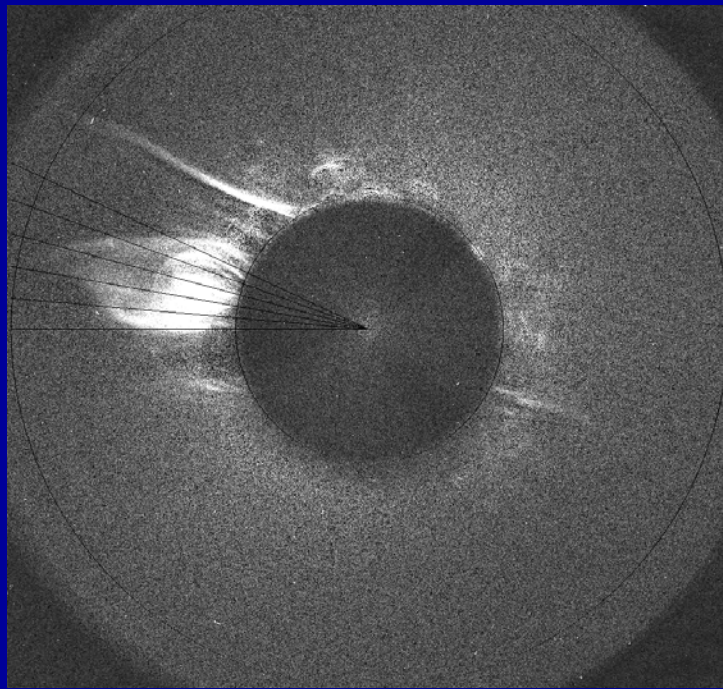
Height-Time Wedge Integration



Similar methods presented by
Sheeley et. al, Dal Lago et al.

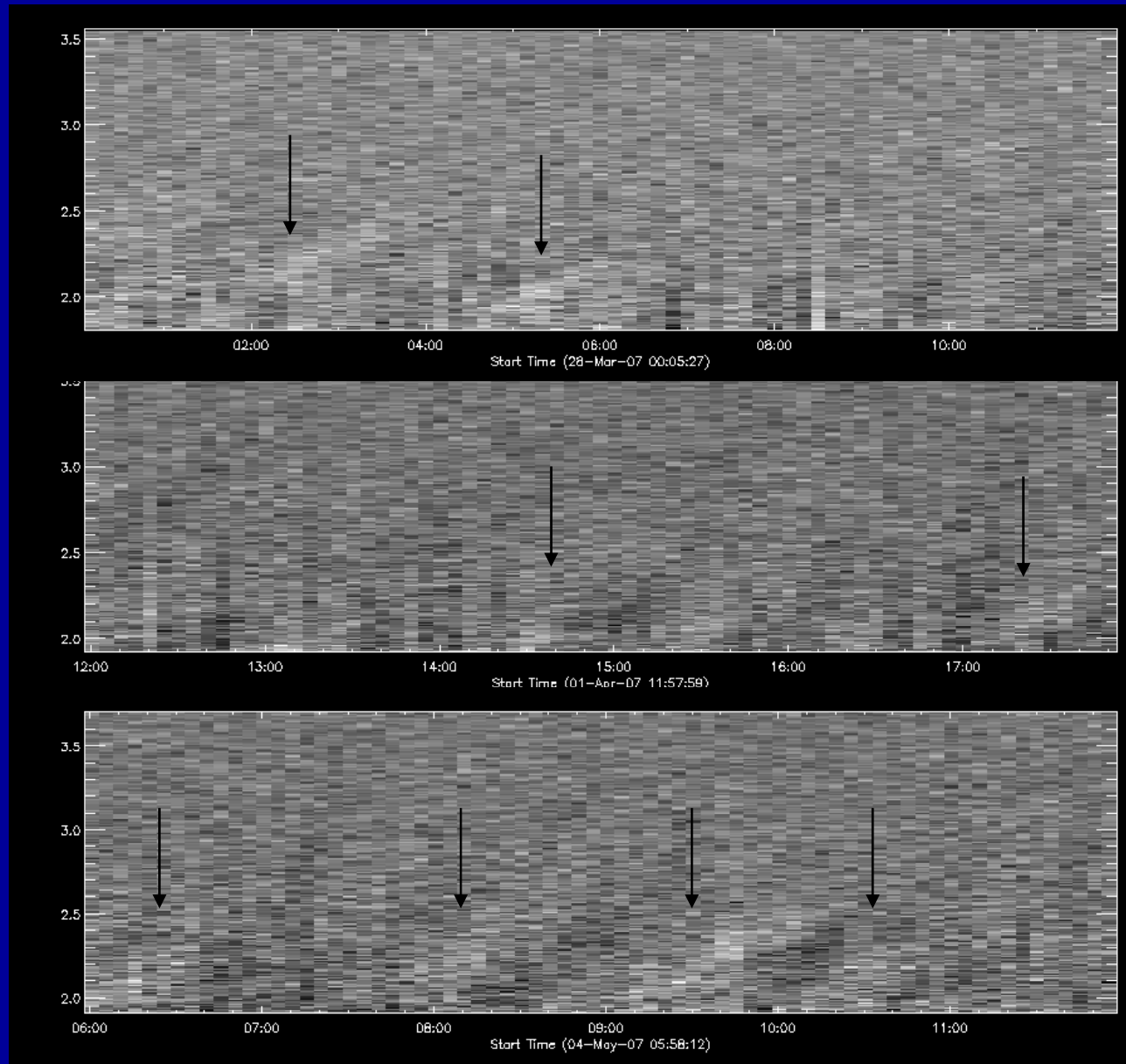


CME Example





Some Faint Feature Examples

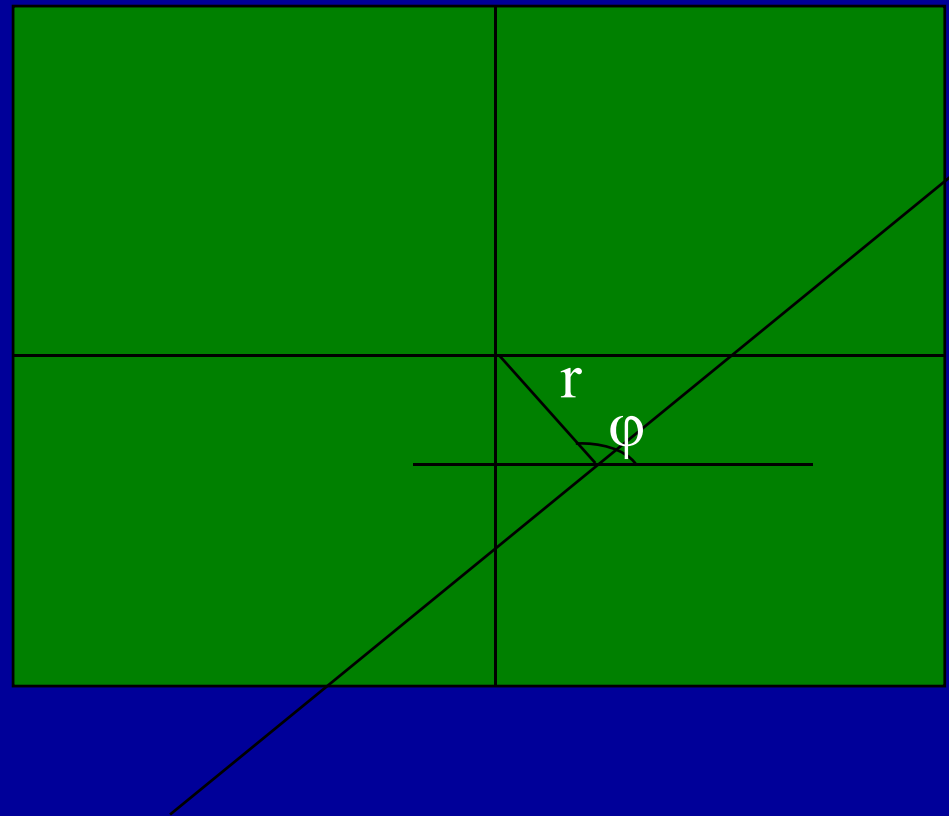


Characterizing Faint Outflows

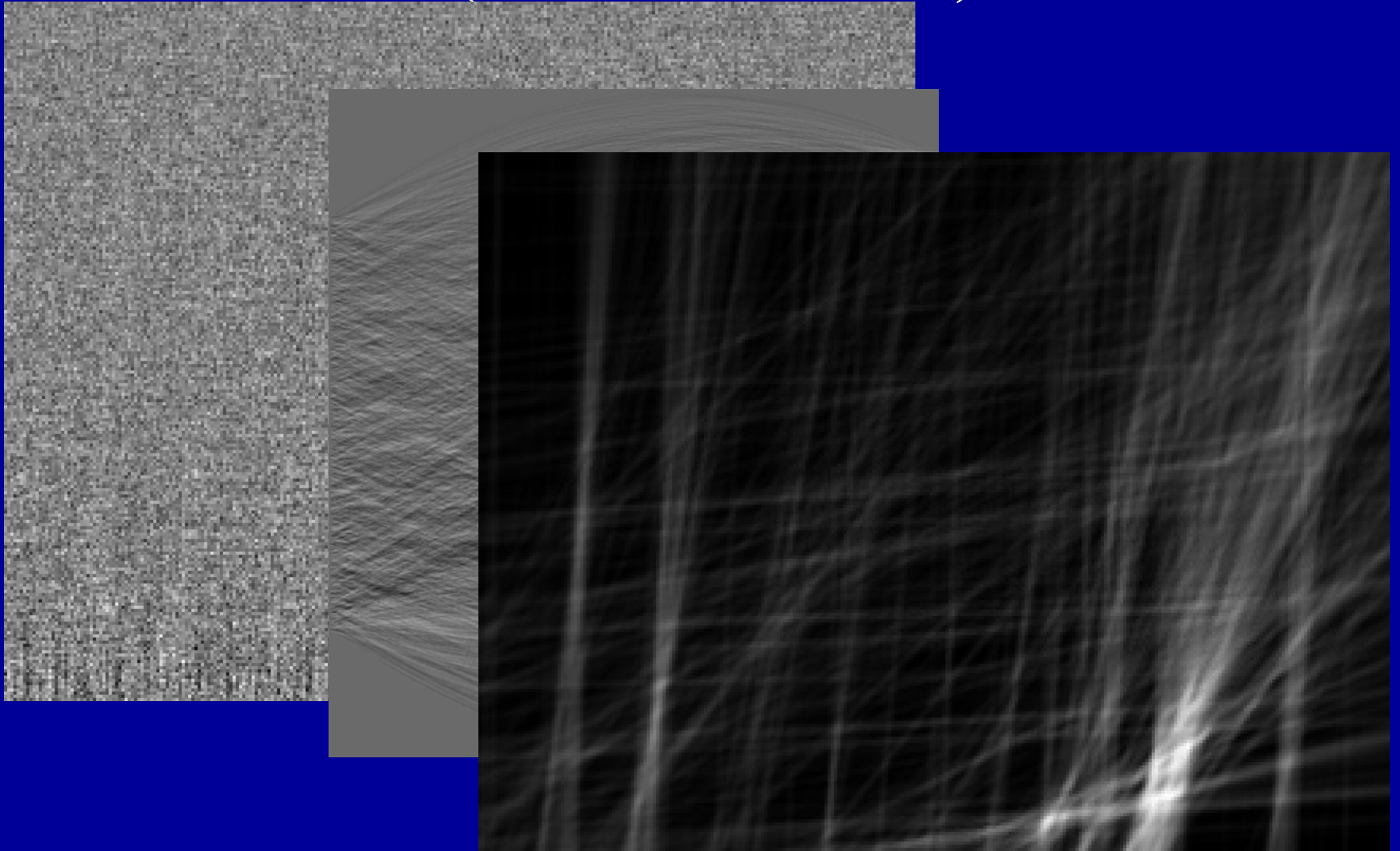
- Interested in measuring properties like time of onset, speed, mass
- Complicated by low SNR
- Observer bias more detrimental than for CMEs

Radon Transform

- Picks out linear features in the image
- Parameters φ, r of the lines determine speed and start time of event
- Similar to Hough transform used by CACTus

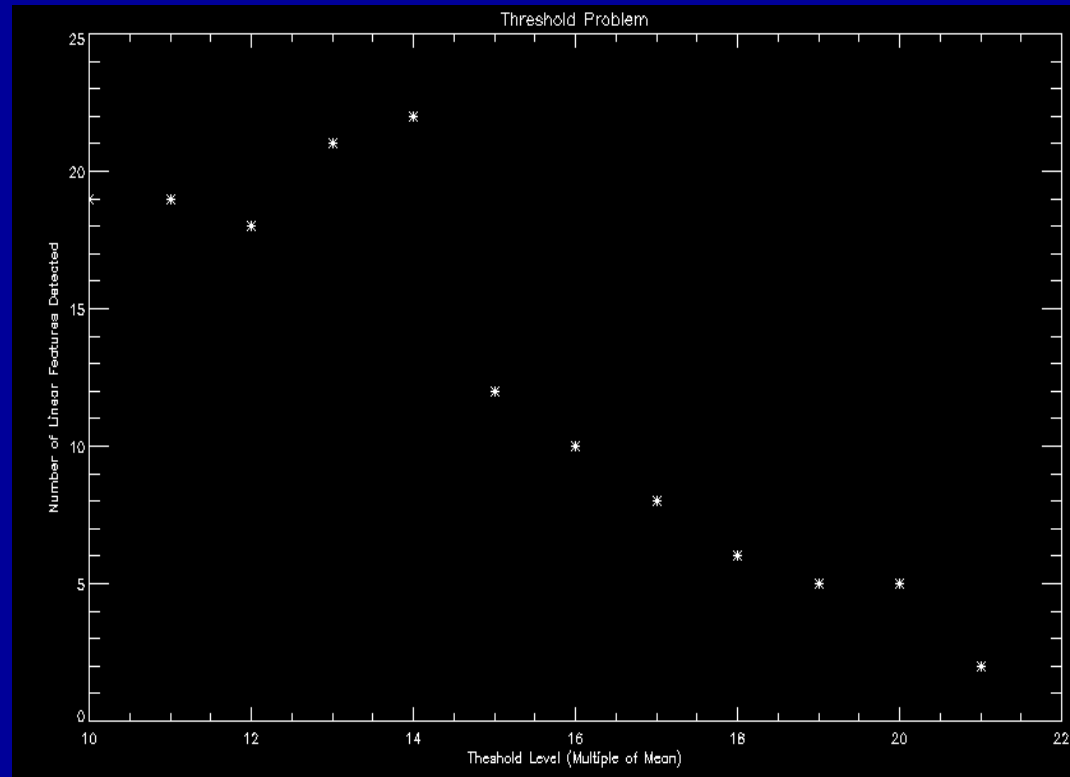


Feature Enhancement Example (CME-related)

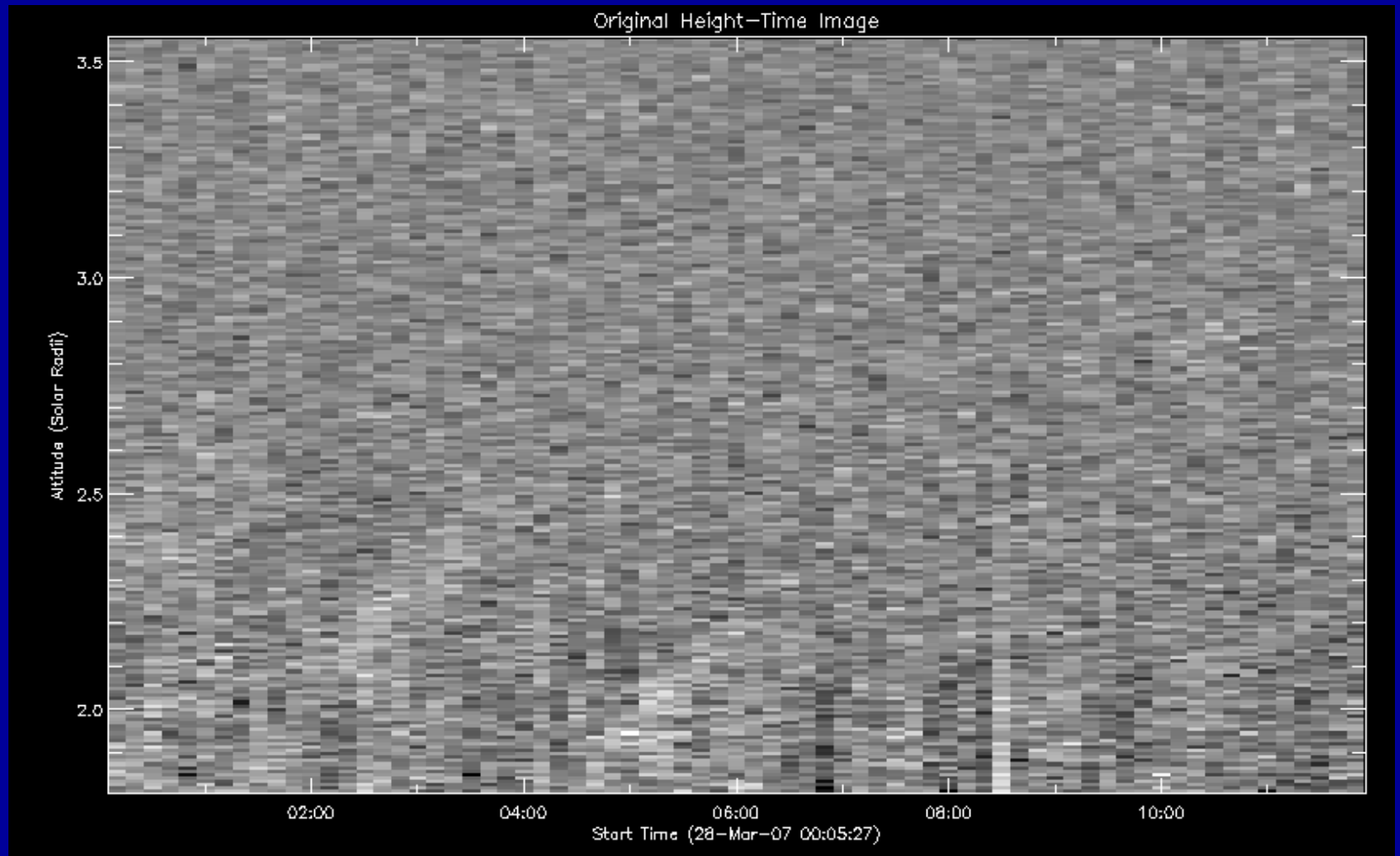


Analysis Challenges

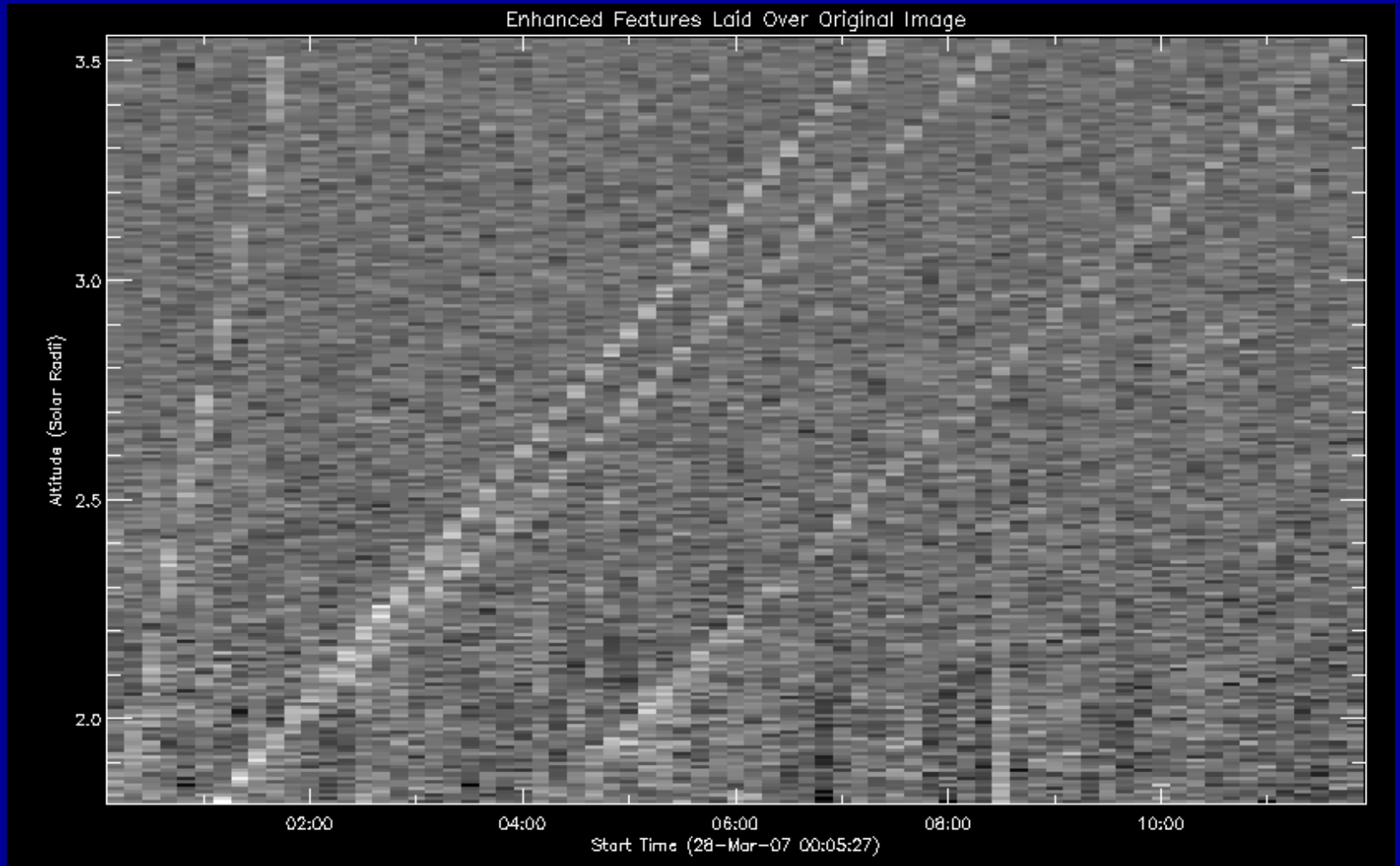
- Determining threshold level
- Spurious detections
- Limited resolution – inherited from the data
- Currently requires images to be regularly arranged in space and time



Preliminary Results

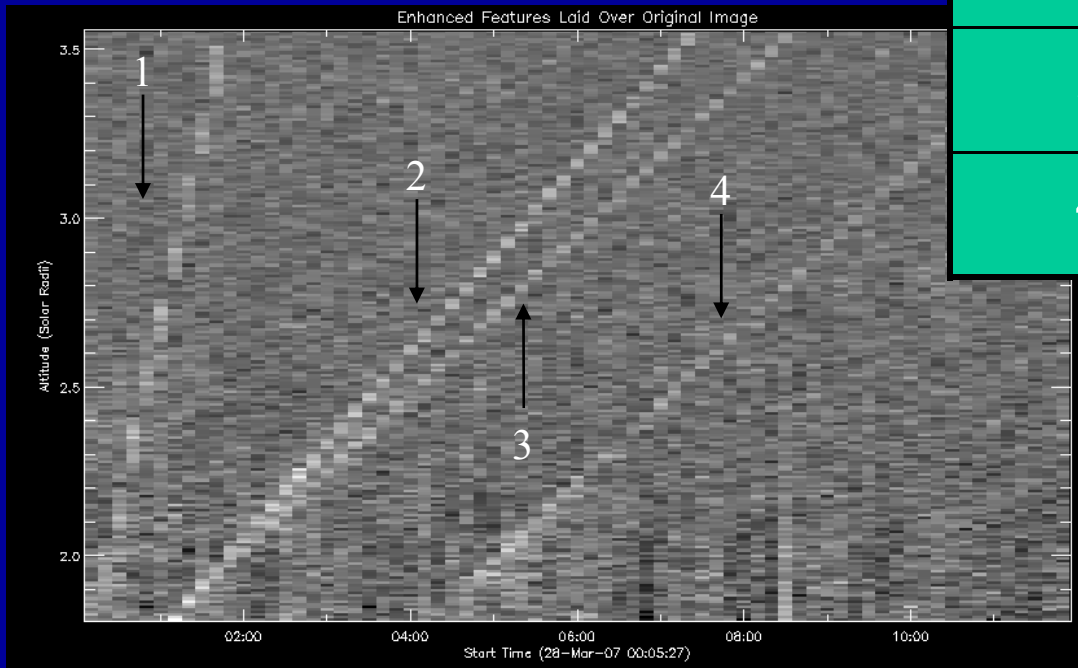


Preliminary Results



Preliminary Results

Event Number	Onset Time	Speed (km/s)
1	00:10:28	216.0
2	01:00:28	53.5
3	01:00:28	45.2
4	04:10:28	45.2



Work in Progress

- Automate threshold level selection
- Combine with COR2/HI data
- Mass estimates
- 3D motion?
- Eventually compare to in situ measurements?

Summary

- Accomplishments
 - Enhance outflows to make measurable
 - Developed basic detection/analysis software
- Future Work
 - Further automate detection software
 - Continue characterization
 - Incorporate data from multiple spacecrafts and instruments