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# Discovery of Correlated Evolution in Solar Noise Storm Source Parameters: Insights on Magnetic Field Dynamics during a Microflare

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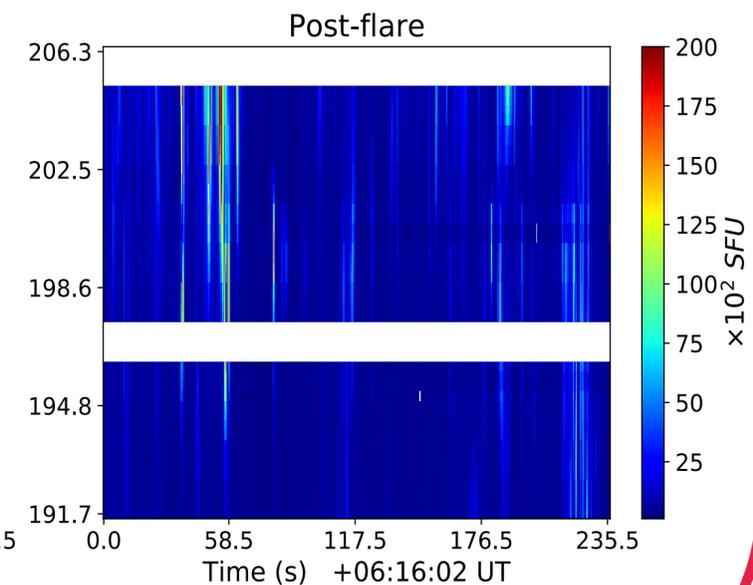
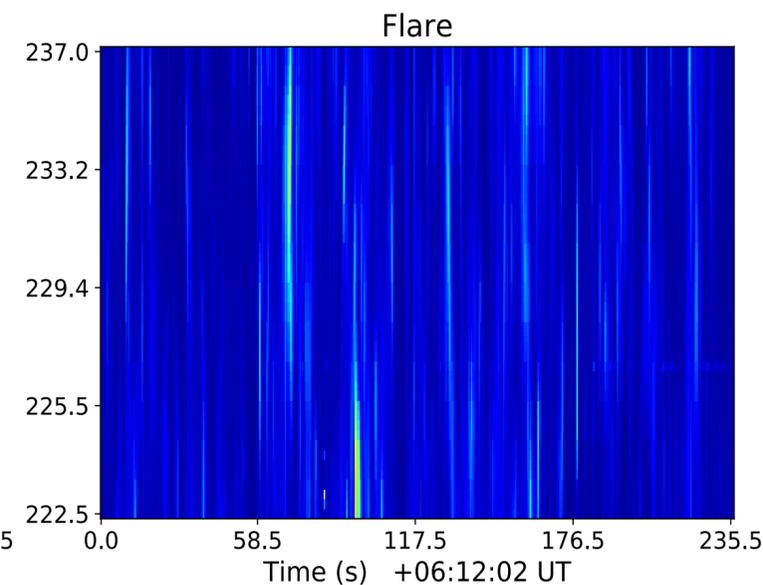
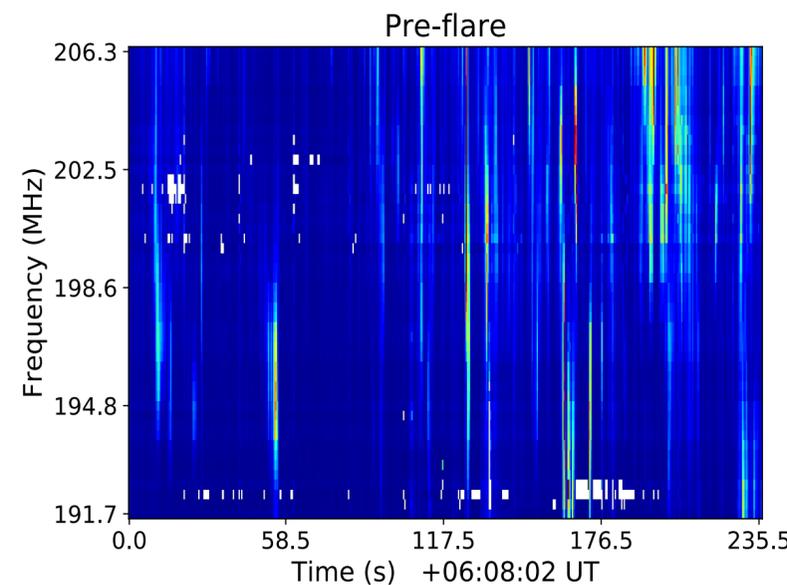
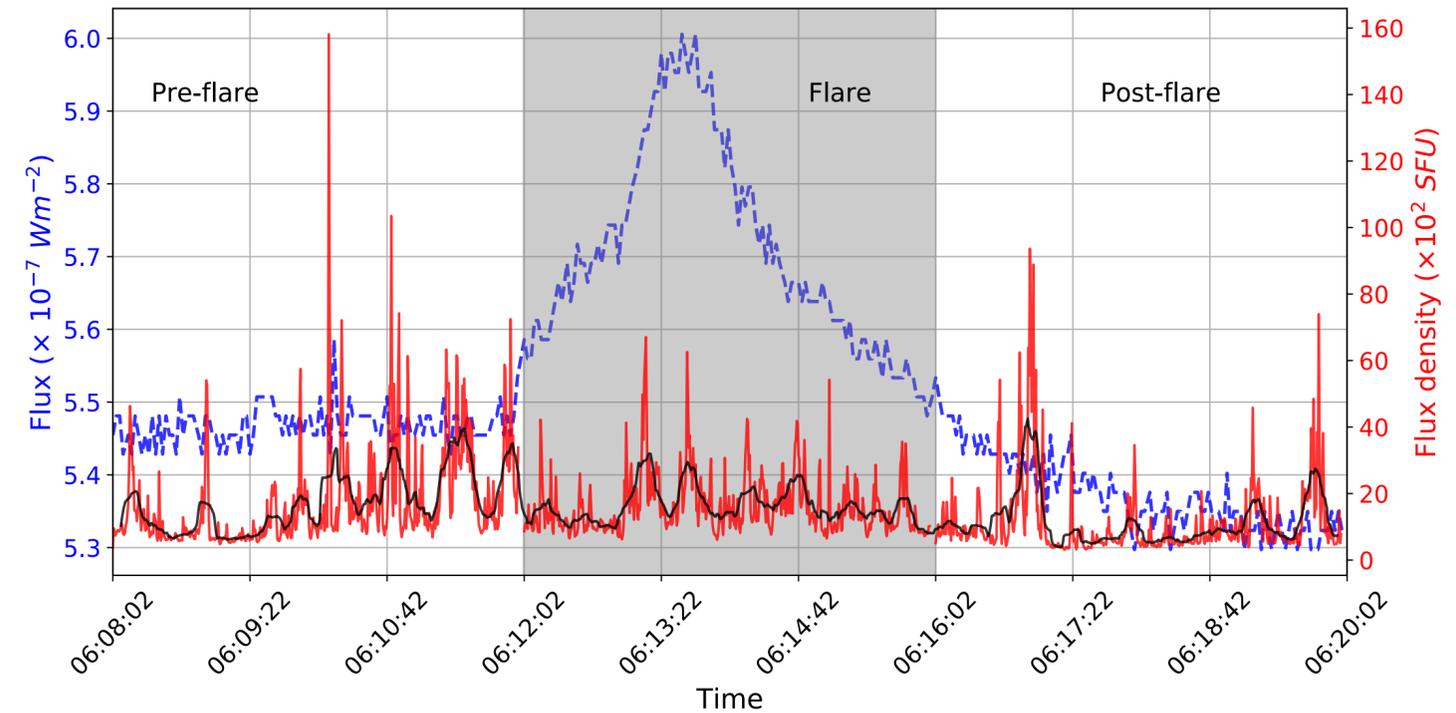
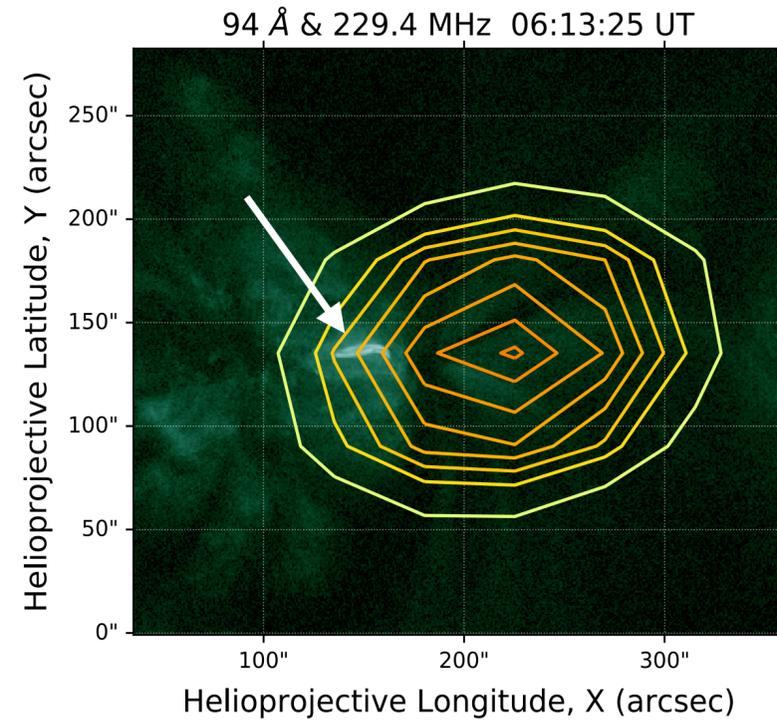
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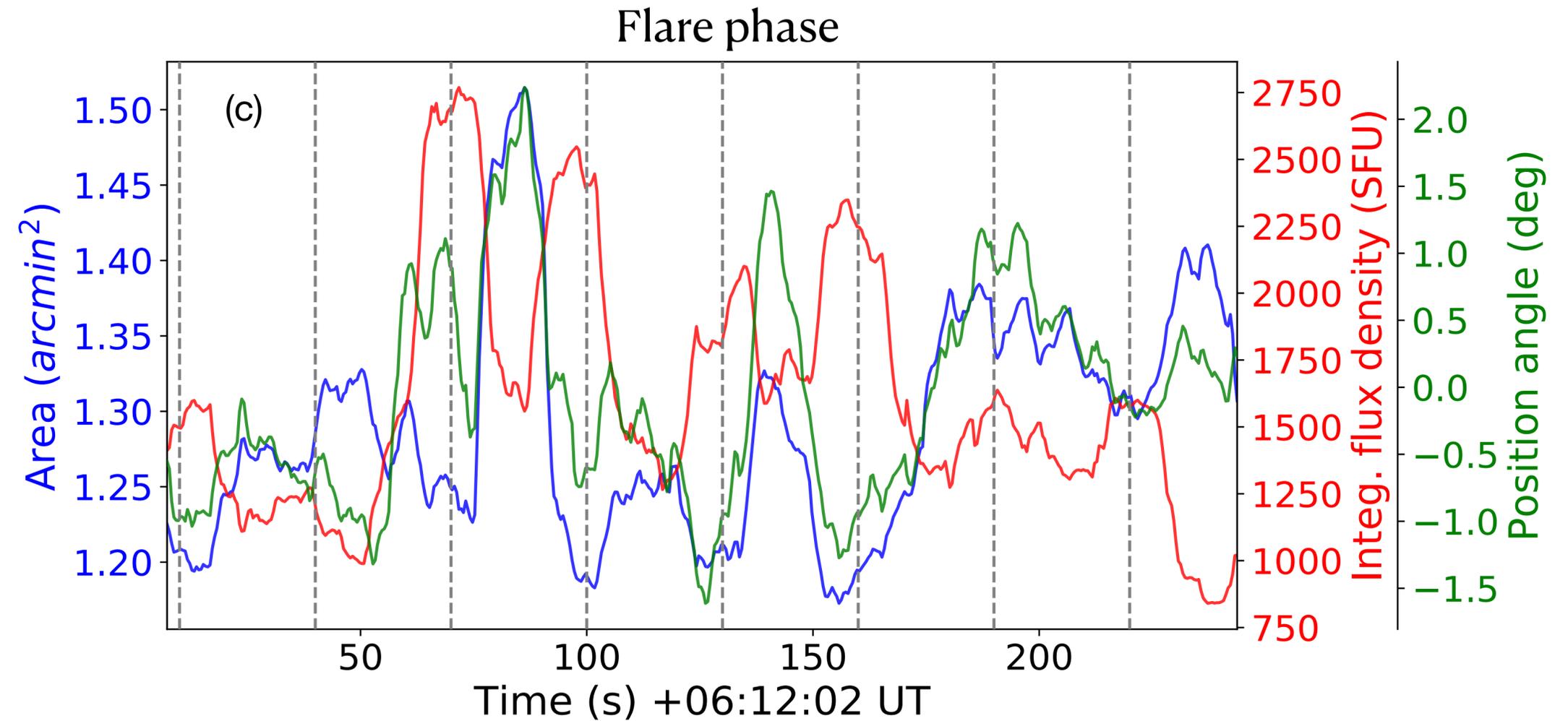
# Event (2014-11-03)

- Radio noise storm (type-I burst)+ ARTB
- B6 class microflare.
- Detailed energetics: [Mohan, A., et al., ApJ, 2019, 883, 45](#)
- **Radio source** → pre-flare to post flare phase.
- MWA Data: 12 min; BW: 15 MHz @ ~ 200 MHz
- 2D Gaussian structure
- Spatially resolved evolution of integ. flux, area and position angle studied.



# Results

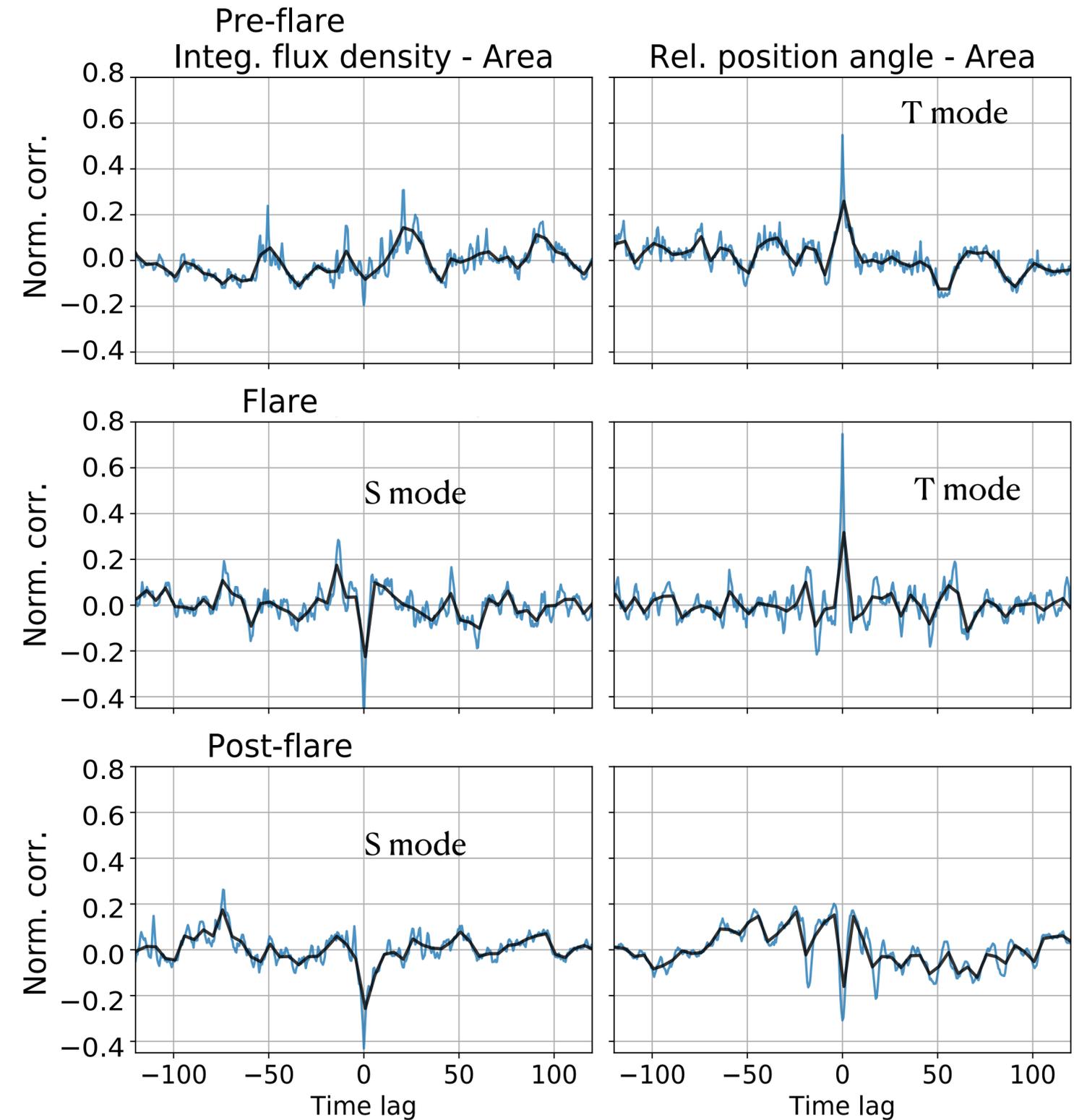
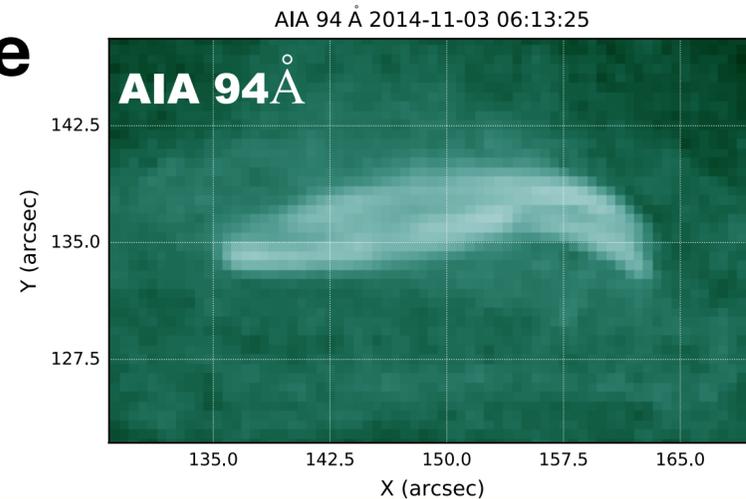
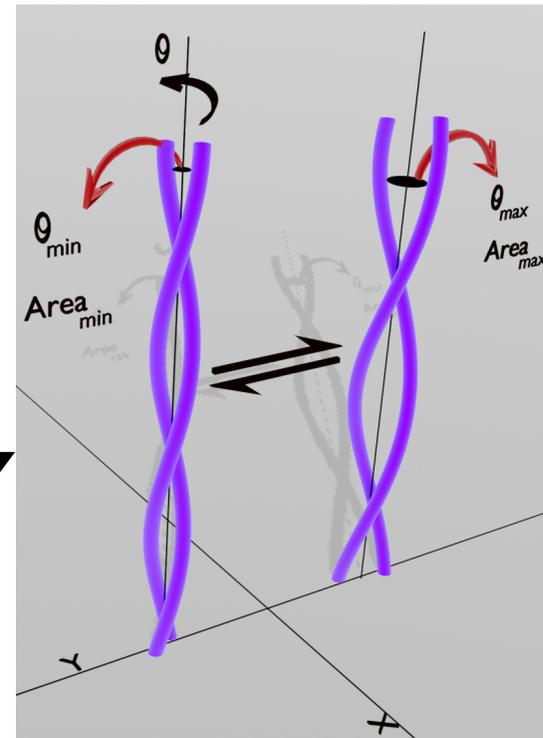
- Correlated evolution in structural parameters
- More stronger and evident during flare phase.



Discovery of correlated **30 s** QPPs in source structure

# Results

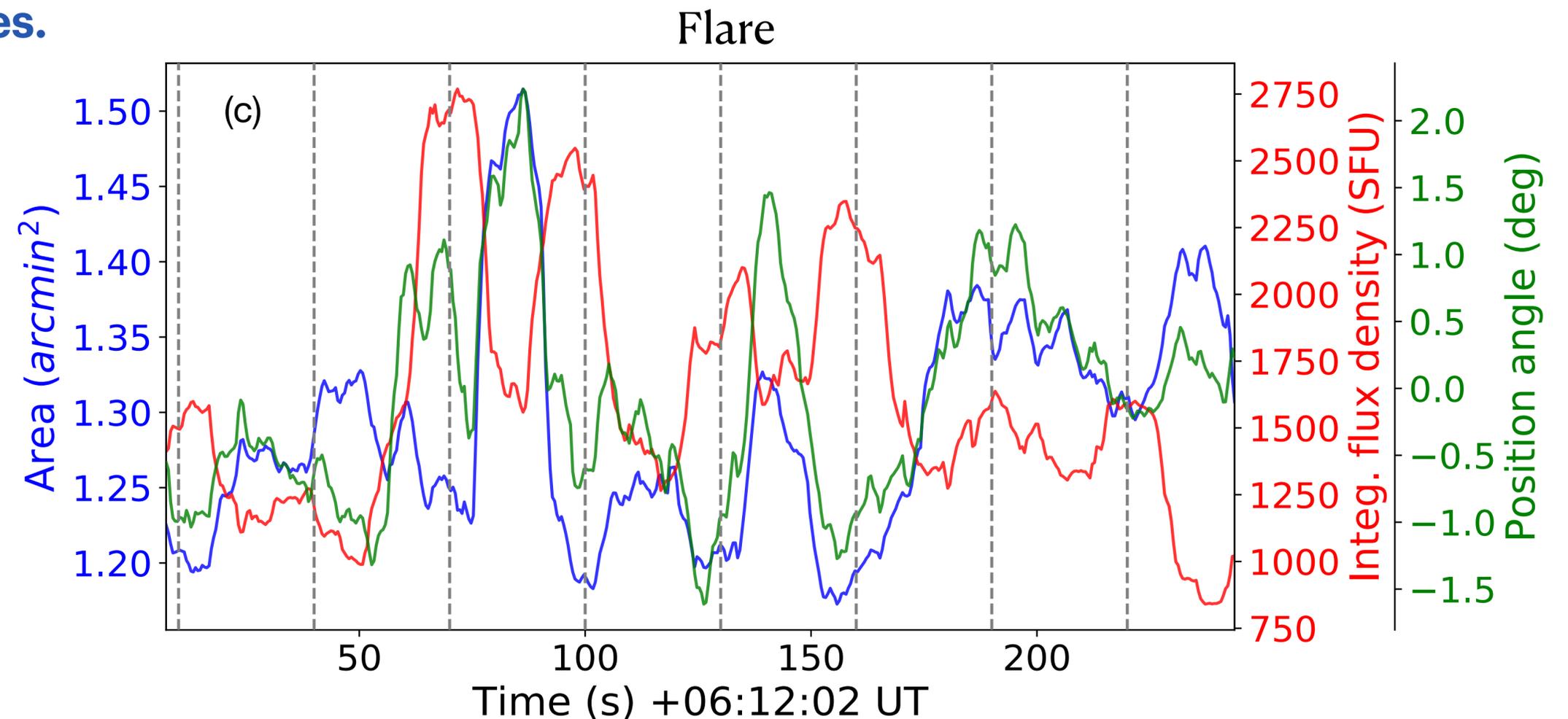
- T & S mode
- T: Area - position angle correlation ~ **winding-unwinding mode**
- S: Area - flux anti-correlation ~ **Sausage mode**



- **T → S Conversion via flare.**
- **Accompanied by microflare heating**

# Conclusion

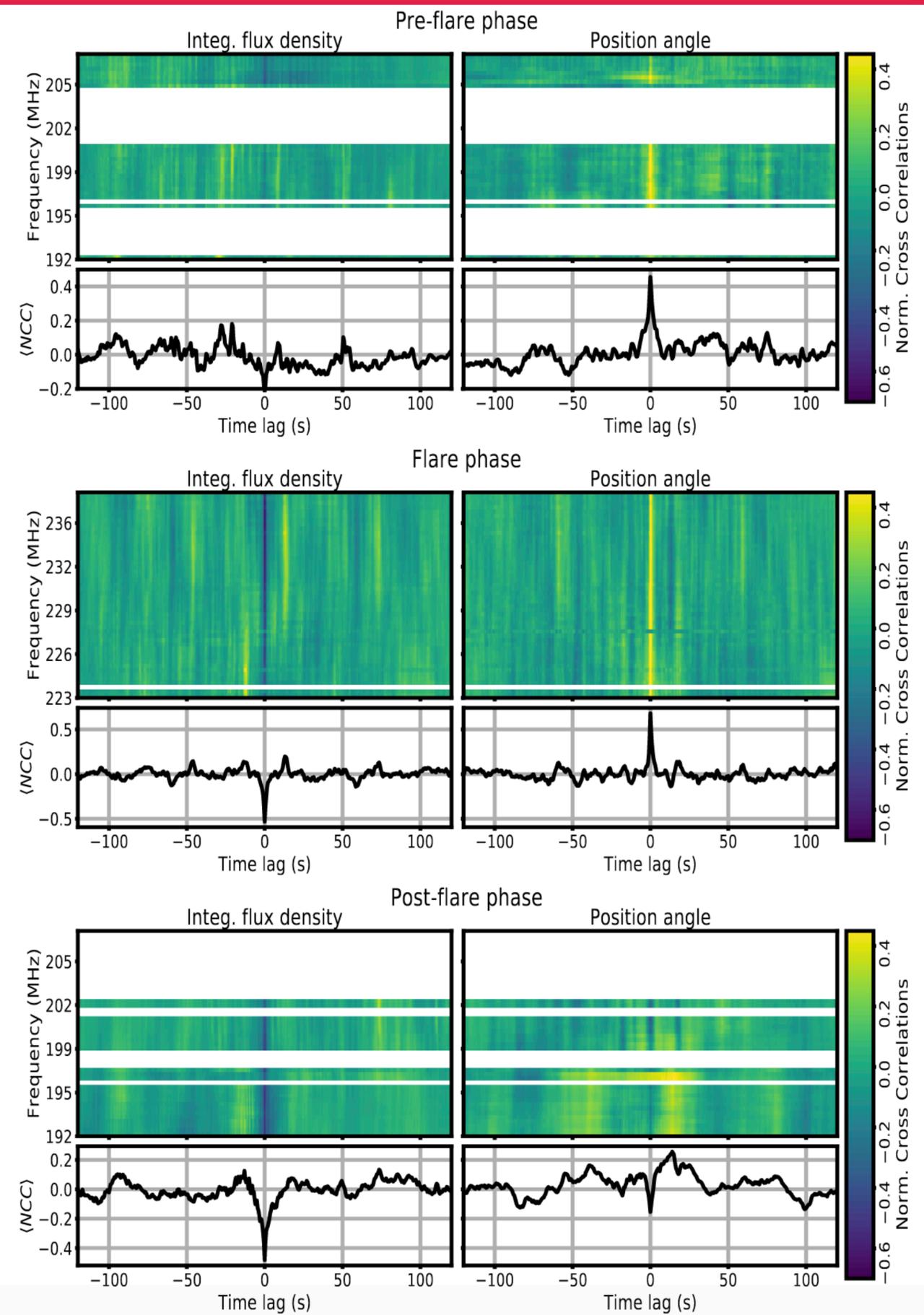
- **Discovery of T & S mode structural variations. 30s QPPs**
- T mode energy density builds up in the pre-flare phase.
- T  $\rightarrow$  S and particle heating as the excess  $\vec{B}$  free energy is released via a flare.
- **Noise storm structural evolution studies  $\rightarrow$  novel means to study internal relaxation of coronal loops esp. in weak flares.**



[Mohan, A., 2021, ApJL, 909, L1](#)

Thank you

# Norm. Cross Correlation across frequency



# Magnetic field connectivity

- NLFF was done.
- Details of the energetics & magnetic field structure: [Mohan, A., et al., ApJ, 2019, 883, 45](#)

