# Multi-wavelength analyses of pre-merging galaxy clusters

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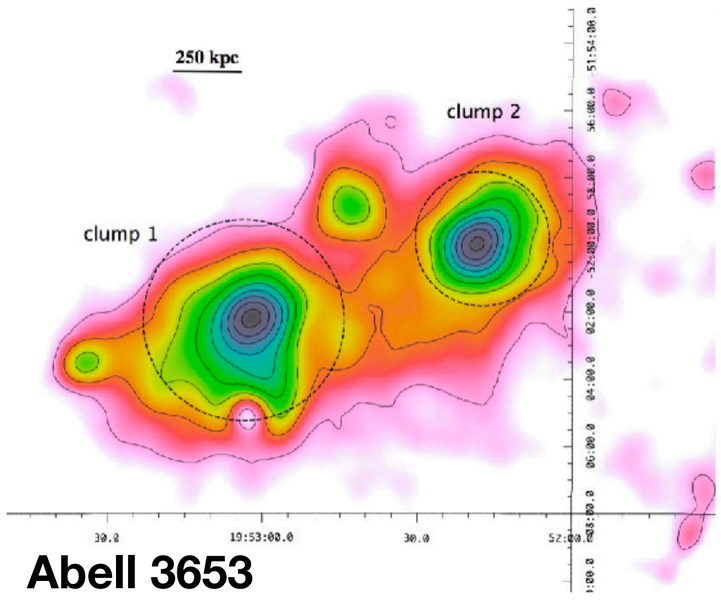
## AIM

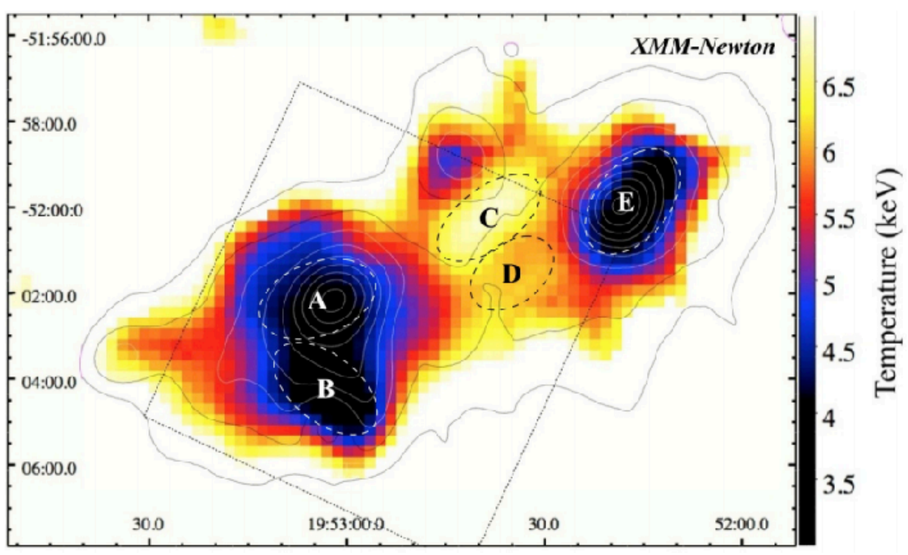
**To understand the dynamical process throughout merger events**

**To understand the X-ray structures of pre-merger galaxy clusters**

## PREVIOUS RESULTS



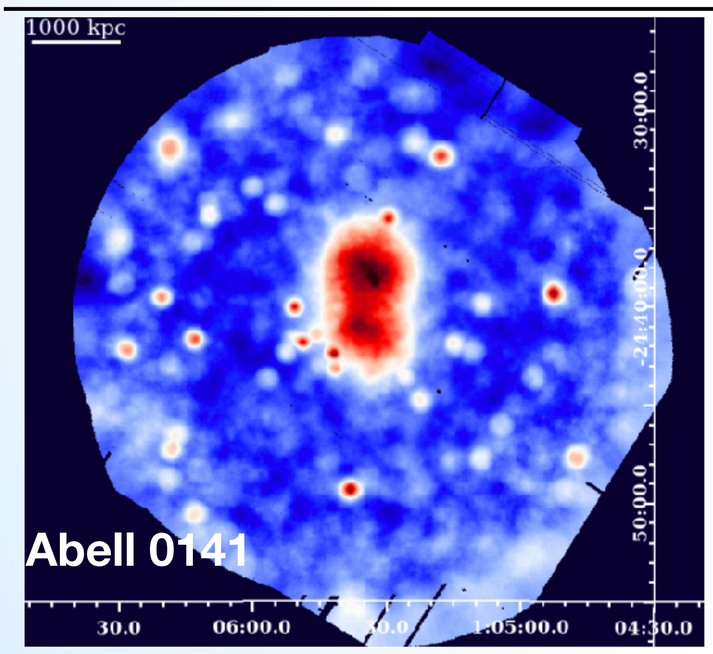

Abell 3653



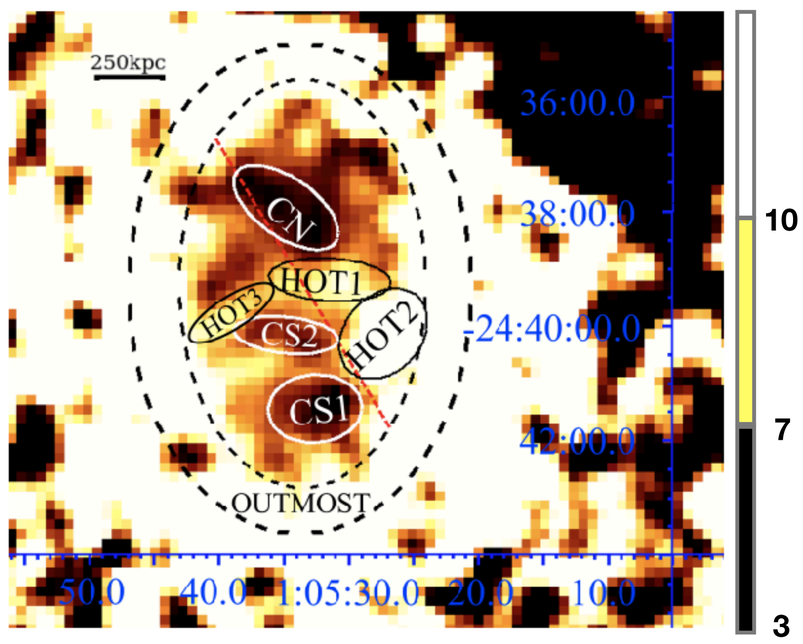

Caglar & Hudaverdi 2017

- Approaching Two sub-groups ✔
- Cool centers ✔
- Temperature Increase ✔
- Surface Brightness drop ✗
- Low Mach Number M < 2 ✗
- In-falling Velocity: 2400 km s$^{-1}$
- Collusion Time: 380 Myr

## HEAD-ON COLLUSION



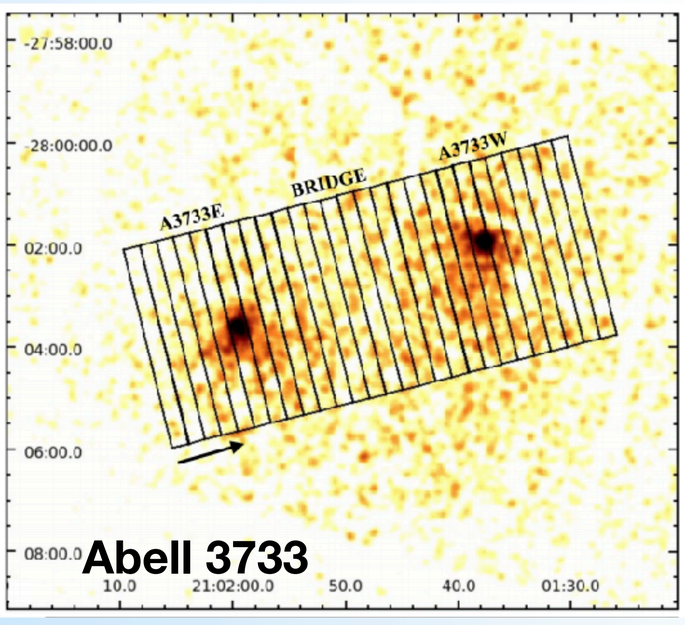

Abell 0141



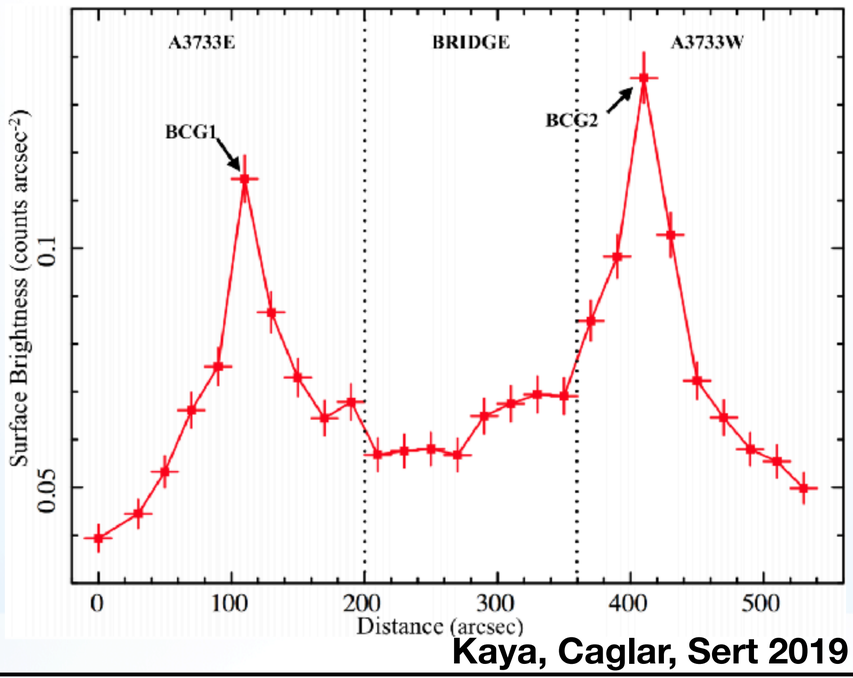

Caglar 2018

- Approaching Two sub-groups ✔
- Cool centers ✔
- Temperature Increase ✔
- Surface Brightness drop ✗
- Low Mach Number M < 2 ✗
- In-falling Velocity: 1686 km s$^{-1}$
- Collusion Time: ~ 400 Myr

## OFF-AXIS COLLUSION




Abell 3733

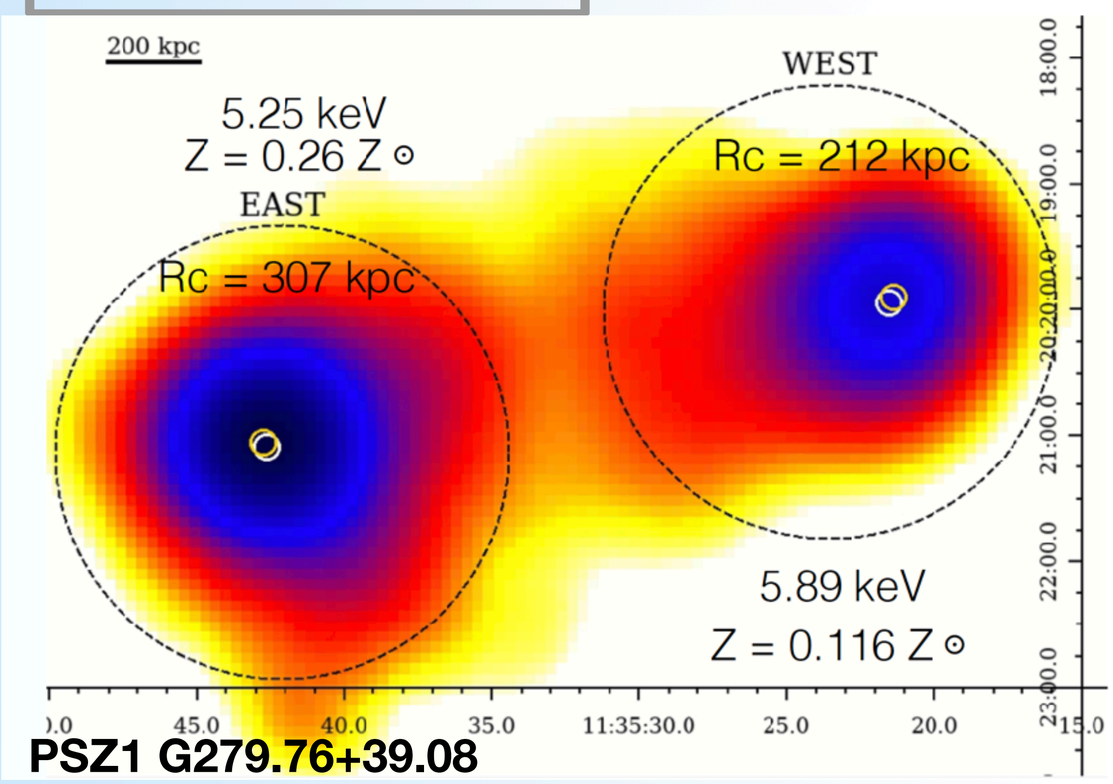



Kaya, Caglar, Sert 2019

- Approaching Two sub-groups ✔
- Cool centers ✔
- Temperature Increase ?
- Surface Brightness drop ✗
- Low Mach Number M < 2 ✗
- In-falling Velocity: 1936 km s$^{-1}$
- Collusion Time: 140 Myr

## HEAD-ON COLLUSION

## WAIT FOR IT




PSZ1 G279.76+39.08

## CONCLUSION

- All galaxy clusters are found to be hosting cooler centers relative to their surroundings
- Slight temperature increase relative to post-merger galaxy clusters
- Low Mach numbers (M<2) are observed in pre-merger galaxy clusters
- Origin of the temperature boost is not certain (shock?)
- Further investigations in multi-wavelength bands are required to understand pre-merger physics