X-ray Observations of Abell 13: Understanding the X-ray and Radio Properties

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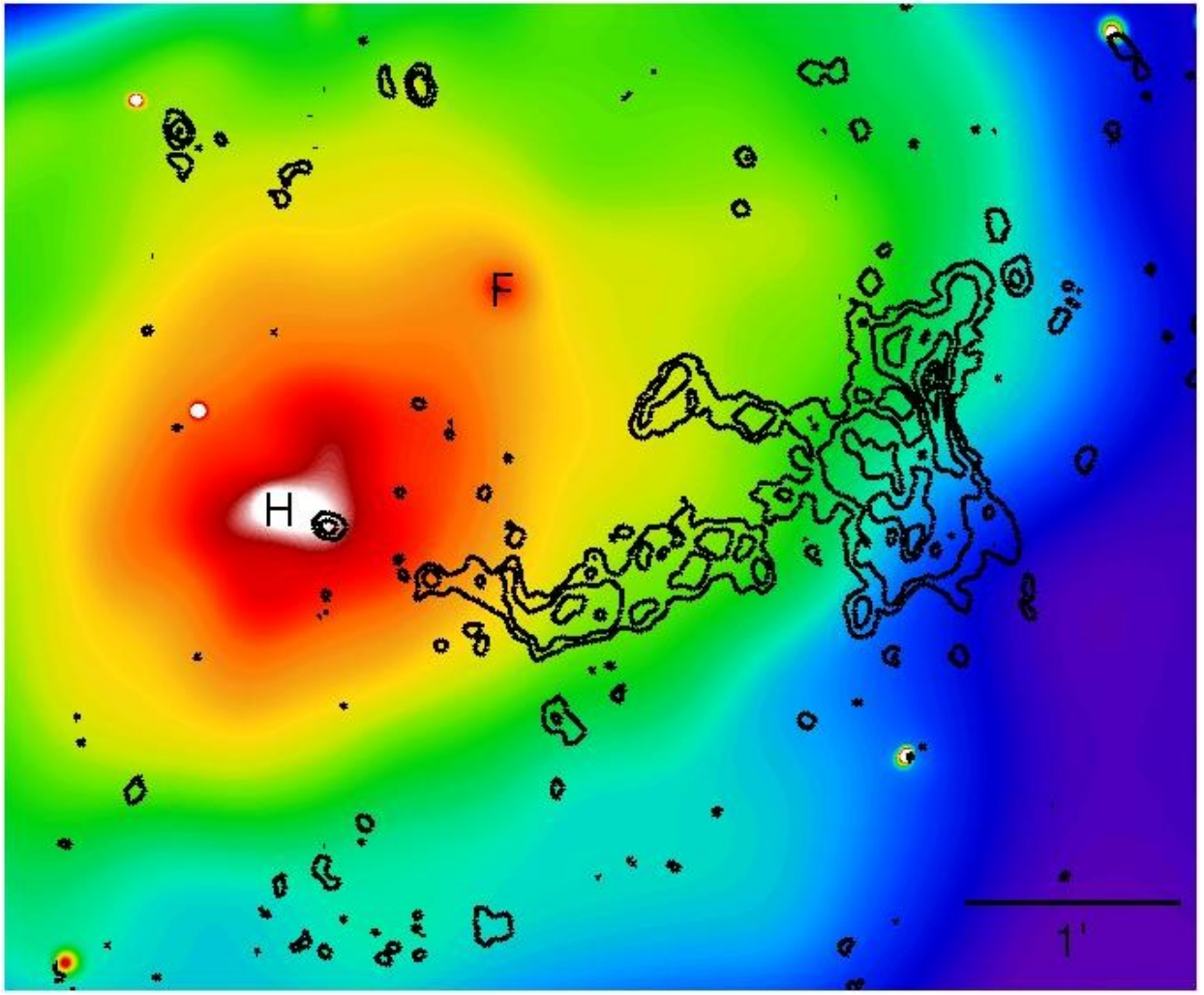
Abell 13

- Cluster at z=0.0943.
- Unusual radio relic (Slee et al. 2001).
  - Relic 3' or 400 kpc from cluster center.
  - Steep spectrum and linear polarization.
- Galaxy redshift distribution is wide, possibly bimodal.
- Chandra observation taken 2004 August for 55 ks.

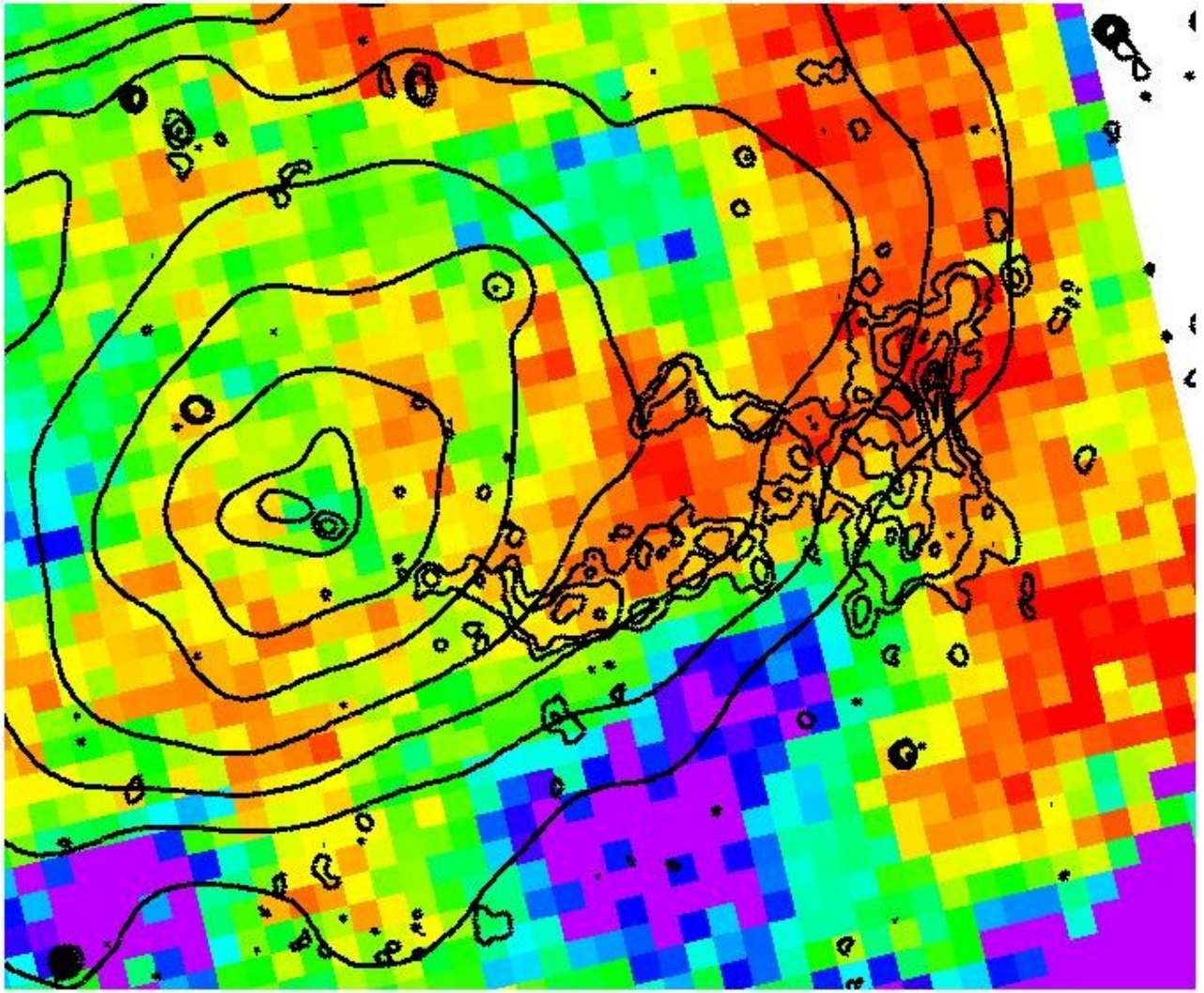
Chandra Image of Abell 13



- X-ray gas centered on galaxy H.
- Enhancement at galaxy F.
- Not relaxed:
  - Elongated NW.
  - Structure in cluster center.

Temperature Map

- Red cooler, purple hotter.
- No cooling flow at center.
- Cool gas near radio relic.



So What's Happening?

Radio Relic due to AGN at Galaxy H.

- Merger Scenario
  - Optical and X-ray point to merger.
  - Galaxy H moved, leaving behind cool gas & radio source.
  - Explains disturbed X-ray morphology, one sided jet, displaced cool gas.
- Uplift Scenario
  - Galaxy H had AGN activity.
  - Relic is radio jet/lobe.
  - Radio plasma uplifted cool gas from cluster center.
  - Explains lack of current AGN activity, radio morphology.