

Mass Reconstruction of Cluster Merger A1758

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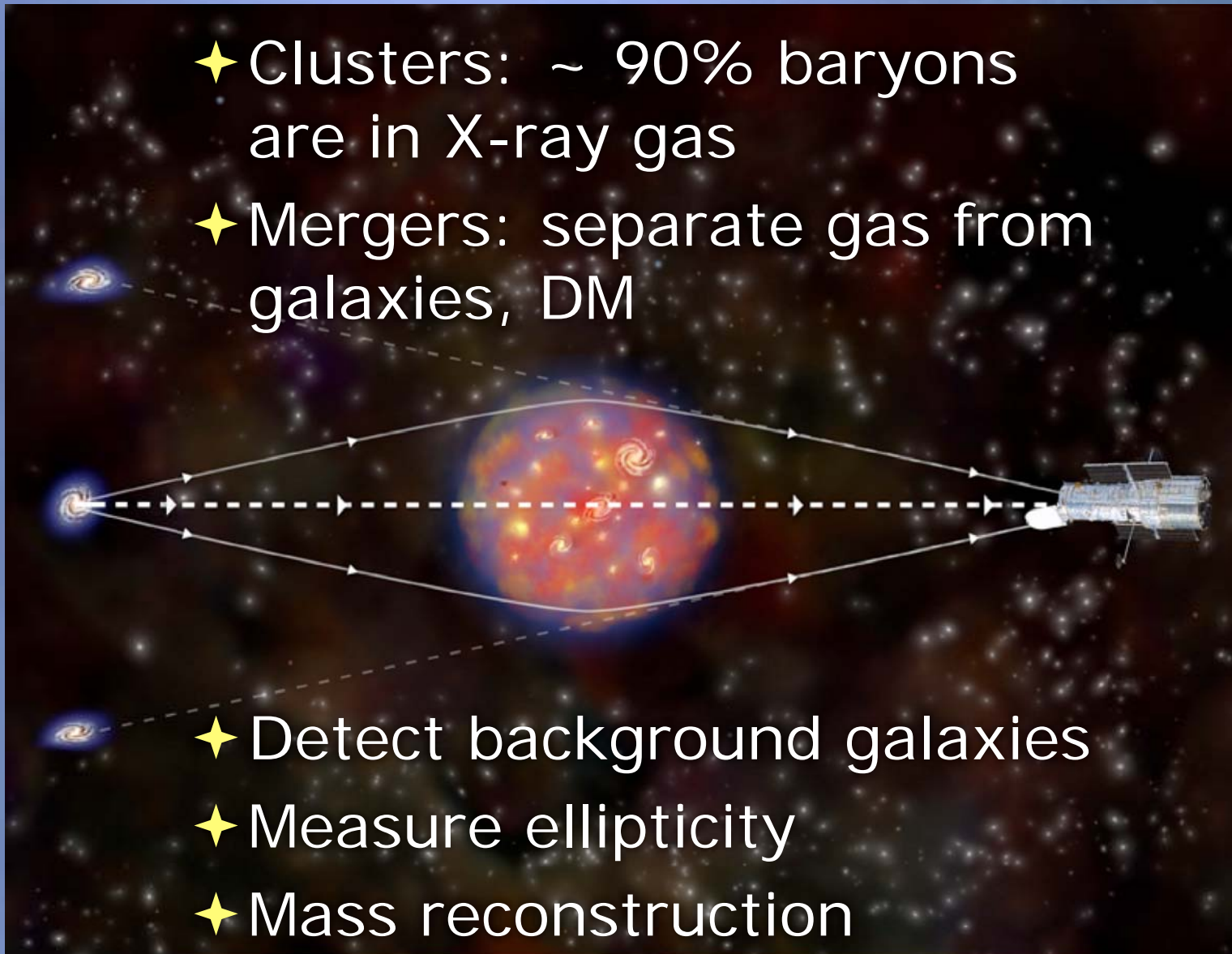
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Outline

- ✦ Introduction
 - ✦ Weak lensing by clusters
 - ✦ Merging clusters
- ✦ Mass reconstruction of A1758
- ✦ Future work

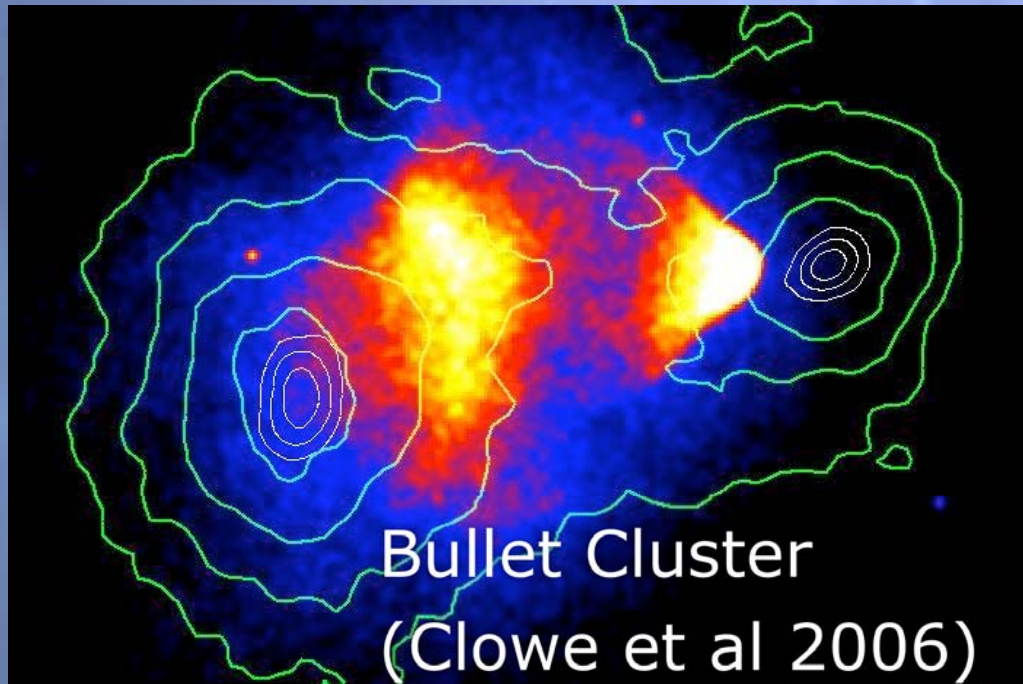
Gravitational Lensing

- ★ Clusters: ~ 90% baryons are in X-ray gas
- ★ Mergers: separate gas from galaxies, DM



- ★ Detect background galaxies
- ★ Measure ellipticity
- ★ Mass reconstruction

WL Success in Mergers

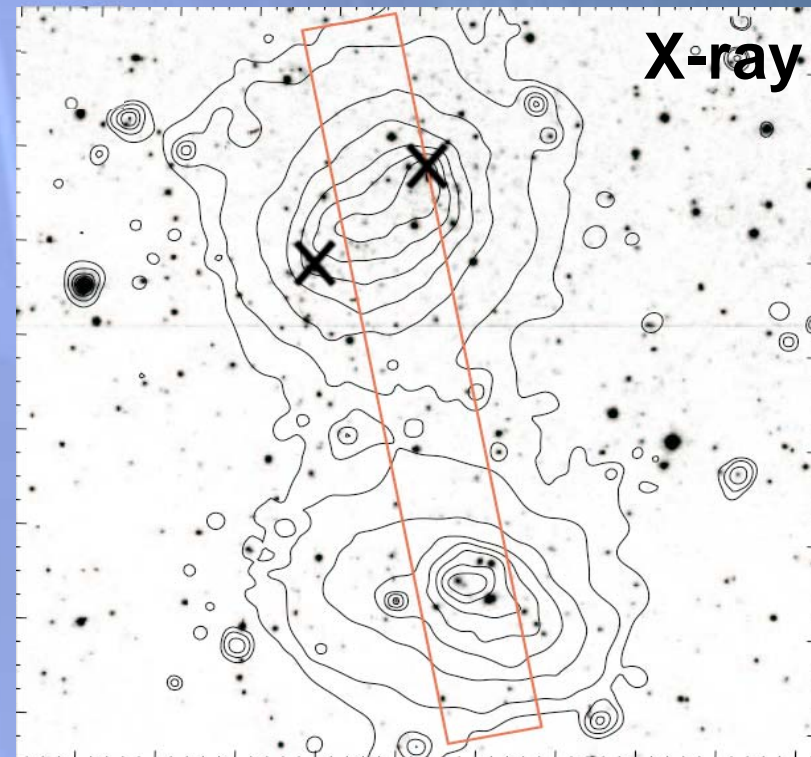
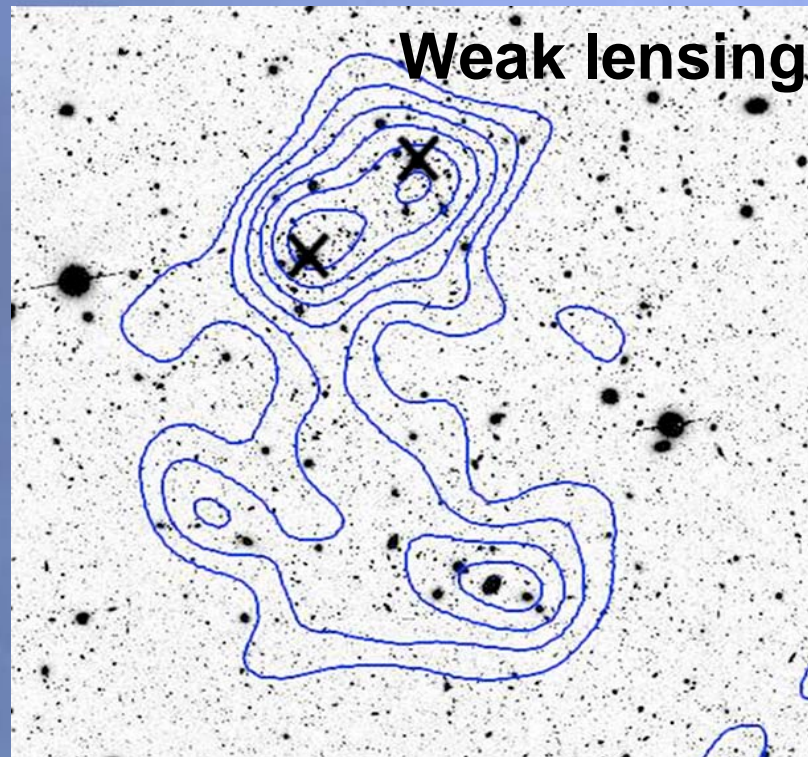


- ✦ Need more merger geometries to avoid conspiracy models
- ✦ CDM vs. MOND



Results for A1758 ($z=0.279$)

16'x15' (4.07x3.82 Mpc)

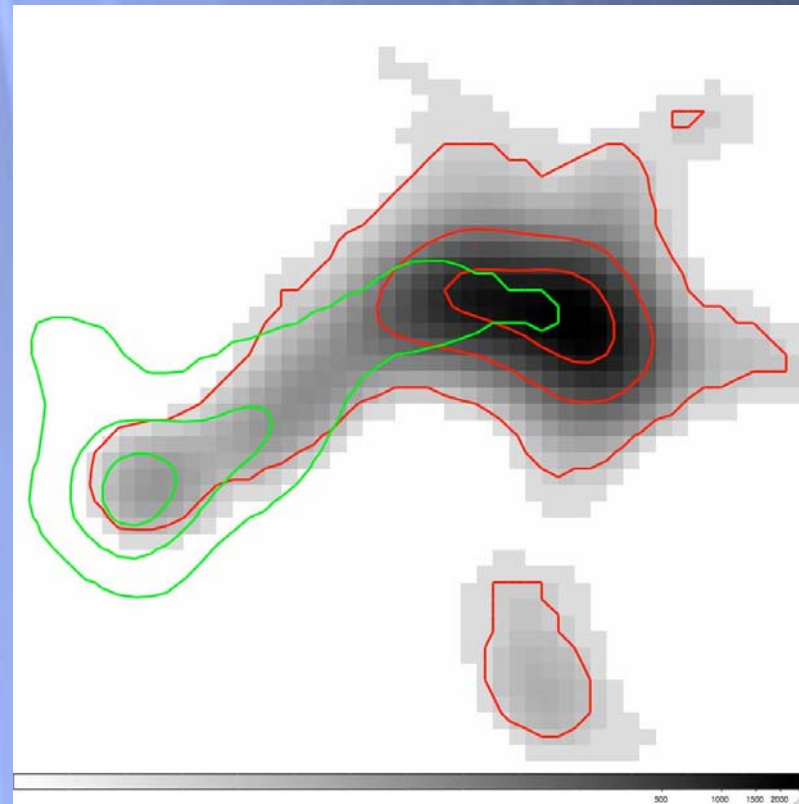
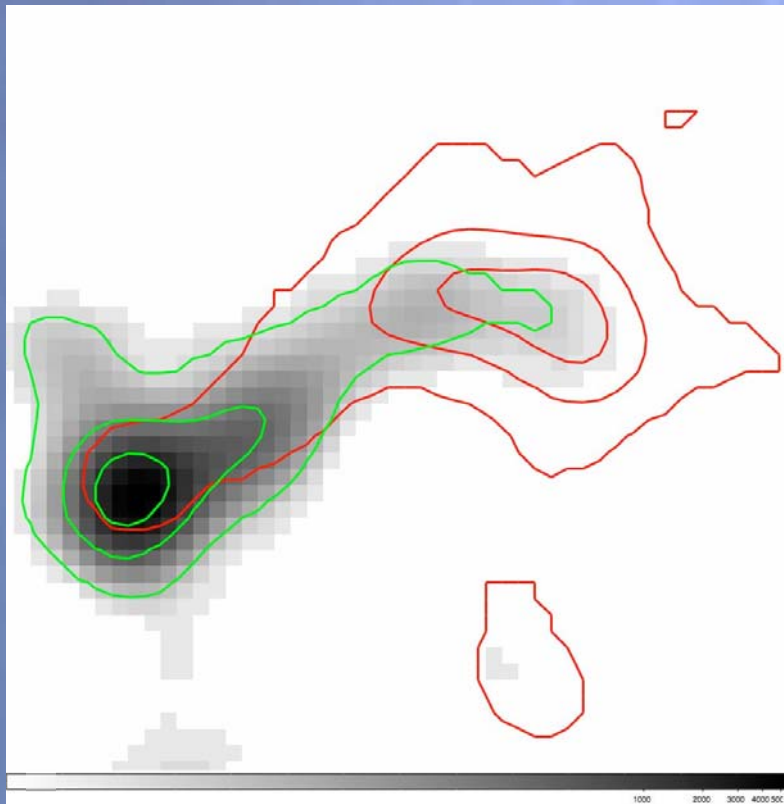


- ✦ Total mass
- ✦ 2 mass peaks $\sim 8 \sigma$
- ✦ 2 clusters $\sim 5 \sigma$

- ✦ X-ray (David & Kempner 2004)
- ✦ Different geometry
 - ✦ 1 offset peak

Tests on A1758N

- ✦ Dominant noise is intrinsic shape of galaxy
- ✦ Error on centroids
 - ✦ Bootstrap: peak separation $\sim 2.5 \sigma$



Future Work

- ✦ Improve S/N in mass reconstructions
 - ✦ 32 orbits of HST for imaging cores of mergers
 - ✦ Add strong lensing to weak lensing
- ✦ Need more mergers
 - ✦ Different geometries
 - ✦ Avoid conspiracy theories
- ✦ Test alternate gravity + DM models
 - ✦ Fraction of DM present in various geometries