

Gravitational Lensing and Hydrodynamic Simulation of Abell 2146

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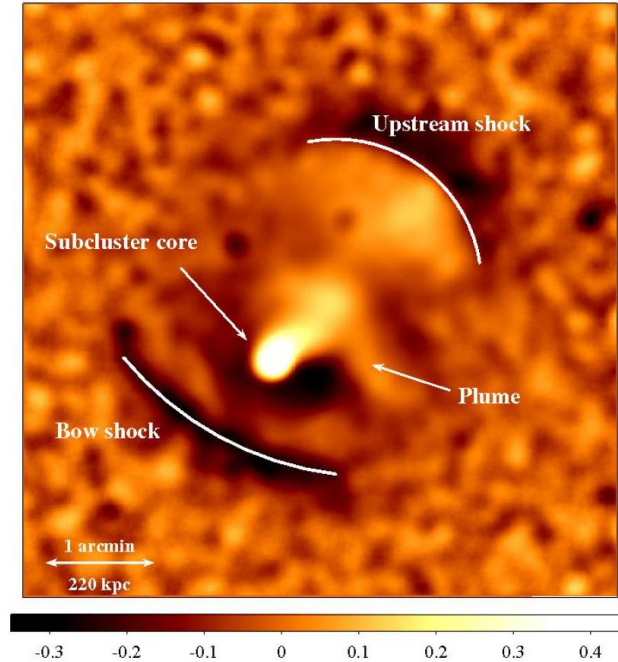
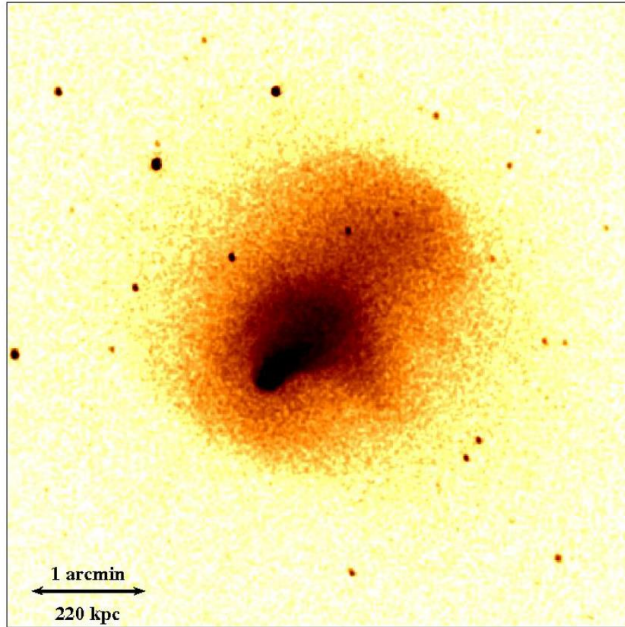
arXiv:1609.06765

MNRAS (Jan. 11, 2017) Vol. 464 2469-2480

The Universe

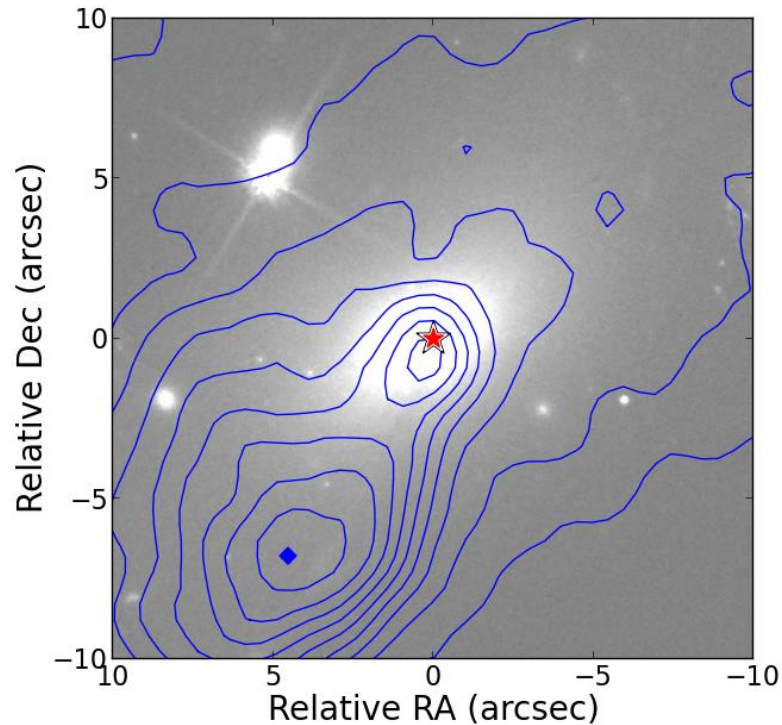
- General Relativity
 - Cosmological Constant (Λ)
 - Cold Dark Matter (CDM)
- Structures

Abell 2146

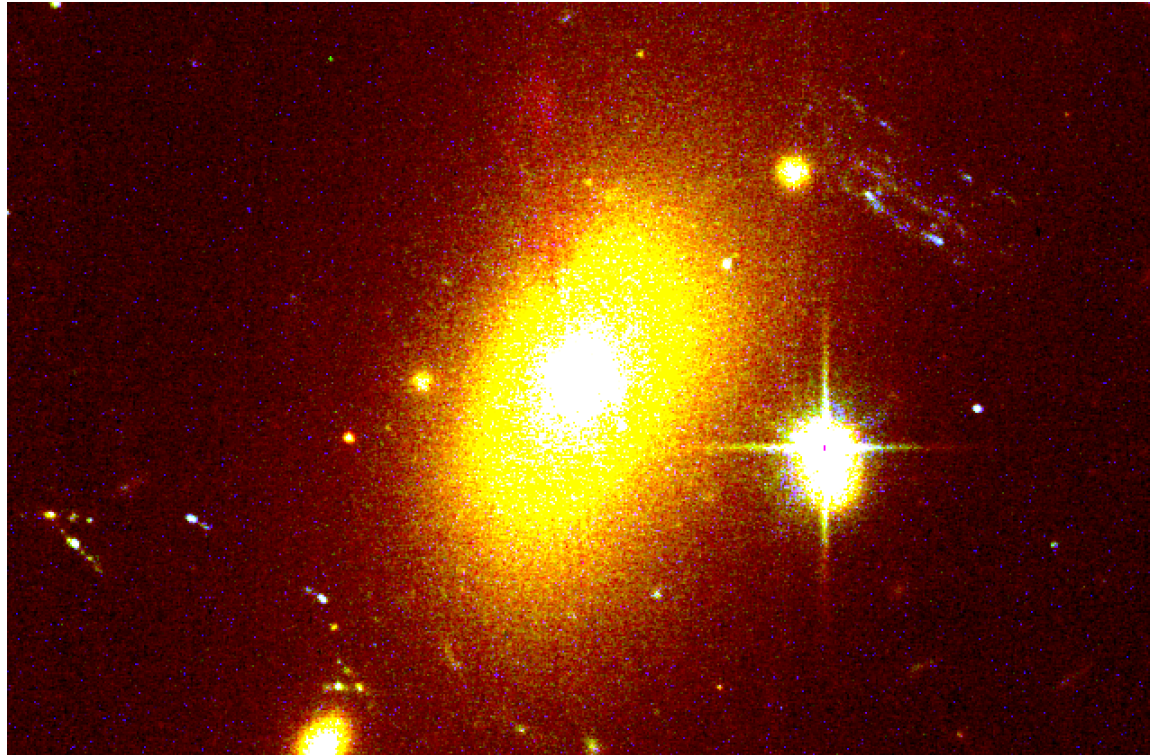


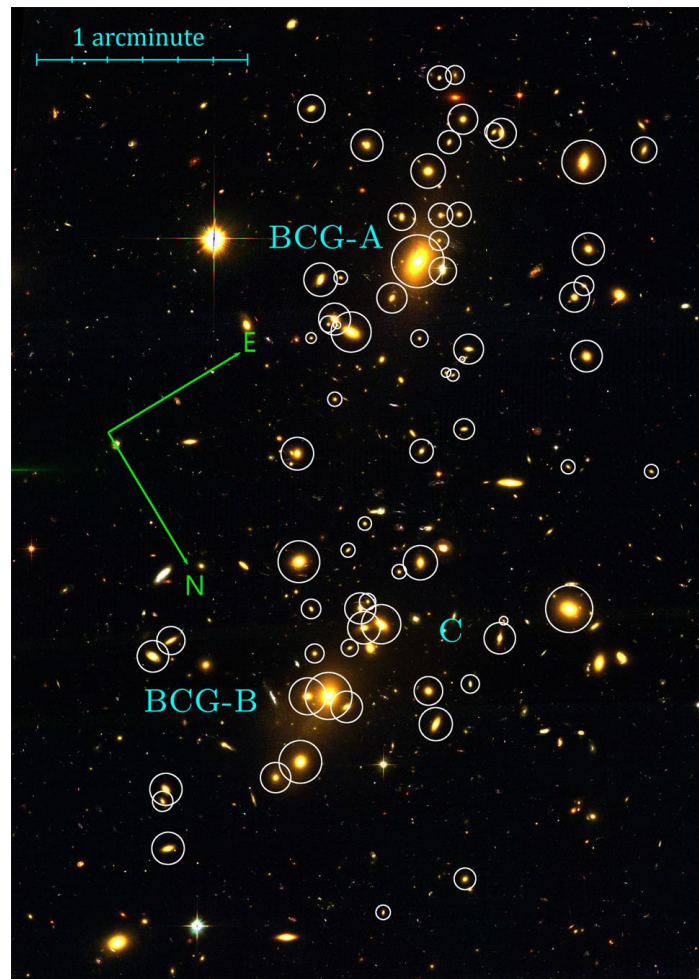
Left: Chandra X-ray 0.3-0.7 keV energy band smoothed with 2D Gaussian $\sigma=1.5$ arcsec. Right: Unsharp-masked image created by subtracting images smoothed with 2D Gaussians $\sigma= 5$ and 20 arcsec, and dividing by sum of two images. Russell et al. 2012.

Abell 2146

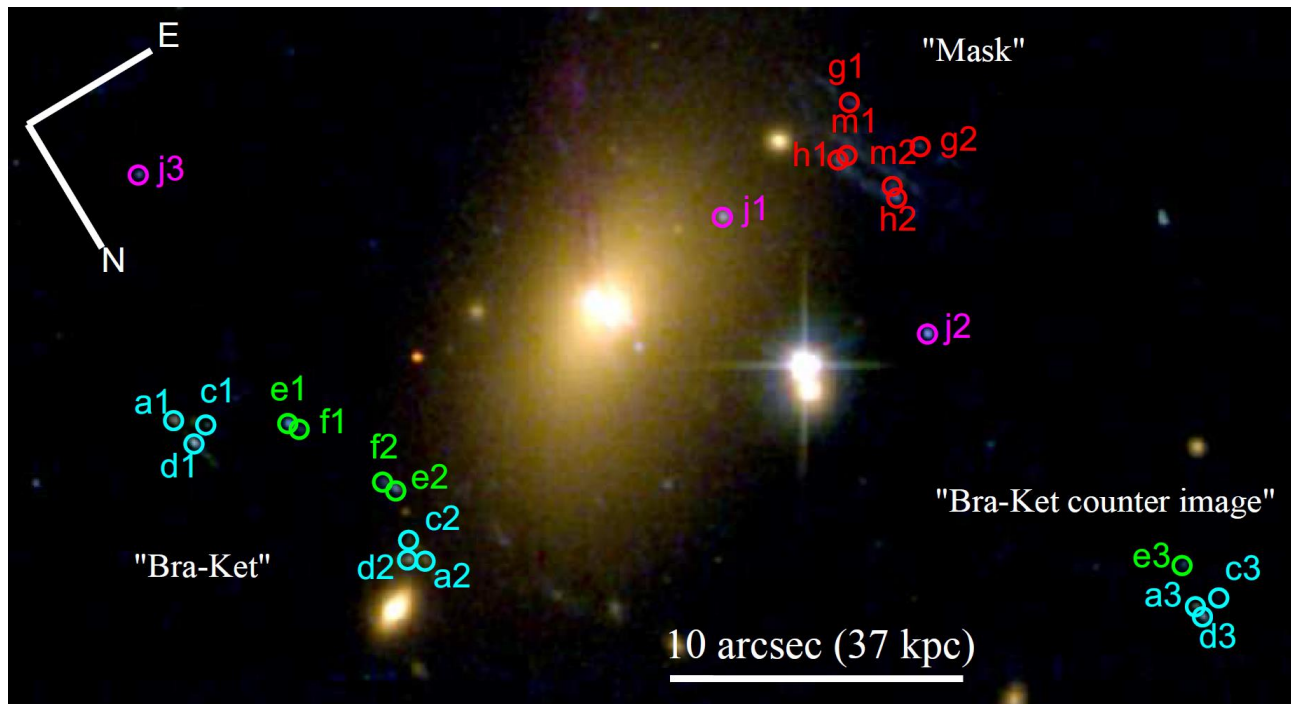


Strong Lensing





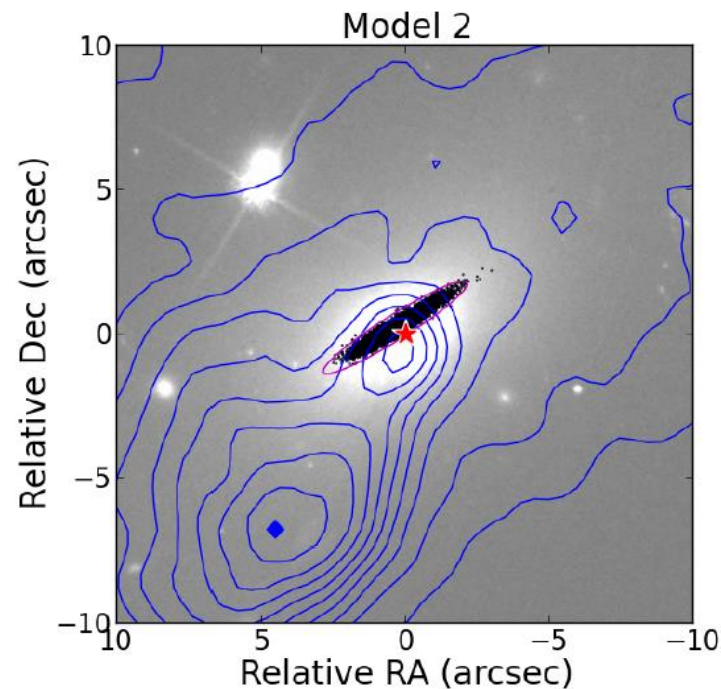
Constraints



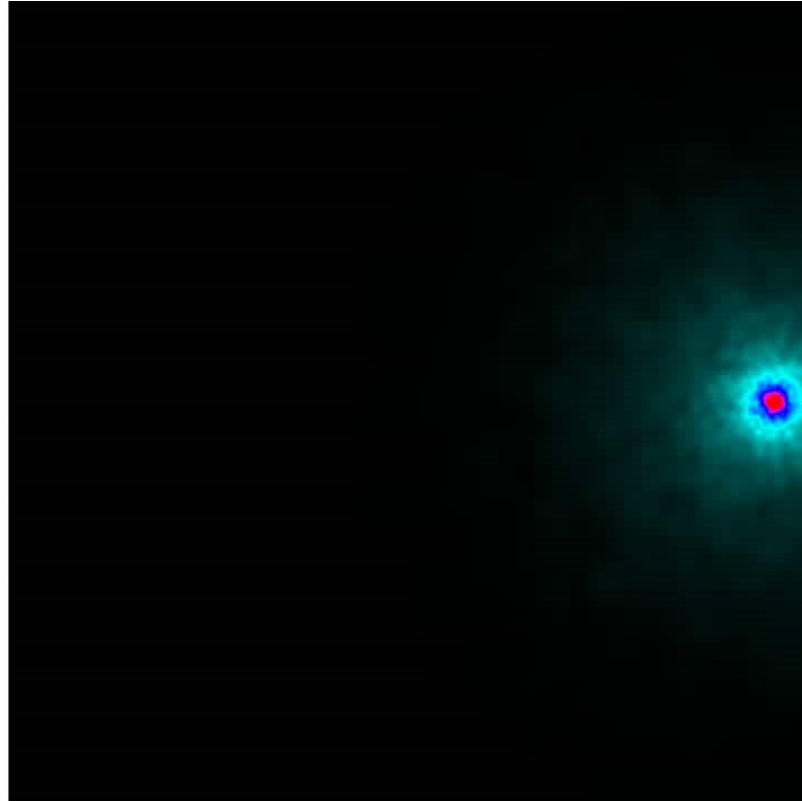
Results

	Model 1	Model 2	Model 3
Separation Distances (kpc)			
BCG-A	4.19	1.63	1.59
X-ray peak	34.5	30.3	30.2
Ln(Evidence)	36.8	41.1	37.8
χ^2/dof	0.51	0.38	0.18

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Hydrodynamic Simulations



Summary

- Dark matter coincident with BCG-A
 - Well constrained
- X-ray cool core leads BCG-A and DM centroid
- Abell 2146 is unique
 - Close to plane of sky
 - Leading X-ray cool core
 - Two shock fronts