

The Distribution of AGN in Massive Galaxy Clusters at $z \sim 1$

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Motivation

Investigate how galaxy cluster environments affect AGN triggering in cluster galaxies and how the feedback of cluster galaxies affect the cluster environment.

Galaxy Cluster Sample

Massive and Distant Clusters of WISE Survey (MaDCoWS): 2000 galaxy clusters discovered in WISE with *Spitzer* followup forthcoming for ~ 2000 .

Largest galaxy cluster sample at $z=0.8-1.3$.

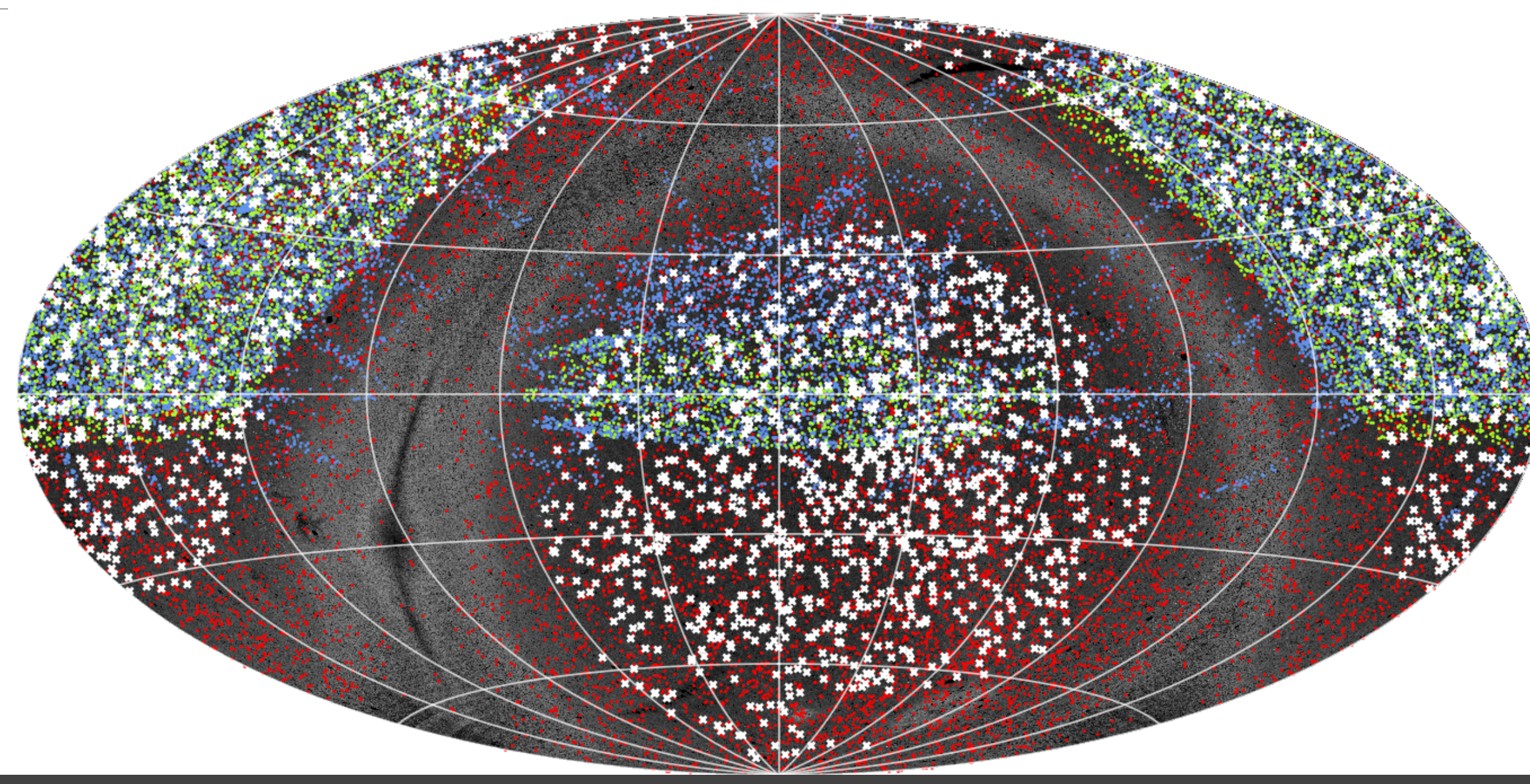


Fig: Positions of 2000 MaDCoWS cluster candidates atop a WISE source density map.
• Optically selected AGN • Mid-IR selected AGN • Radio selected AGN x MaDCoWS Galaxy Cluster

AGN Catalogs

Optically-selected AGN:
Richards+2015, 1.9×10^6 AGN

Mid-IR-selected AGN:
Secret+2015, 1.4×10^6 AGN

Radio AGN: Faint Images of the Radio Sky at Twenty-cm (FIRST), 6.5×10^5 AGN

Methods

The **cluster AGN distribution** is determined by stacking upon cluster positions.

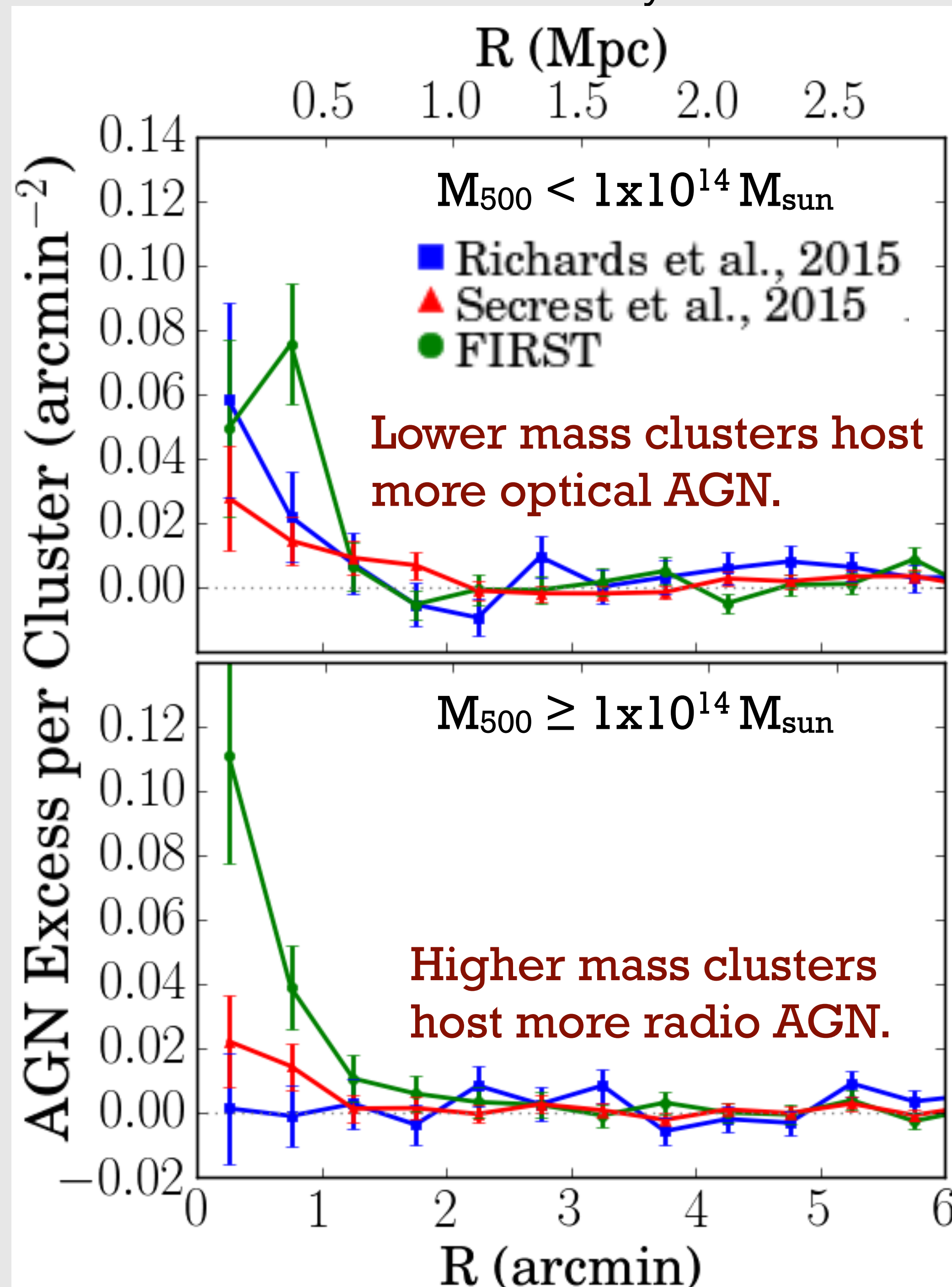
The **background AGN counts** is the average AGN surface density at $30''-60''$ from cluster center.

Cluster centers determined via number-weighted algorithm using WISE data are accurate to within $\sim 21''$.

Results: Radial Distribution of AGN Excess in MaDCoWS Galaxy Clusters

Cluster Mass

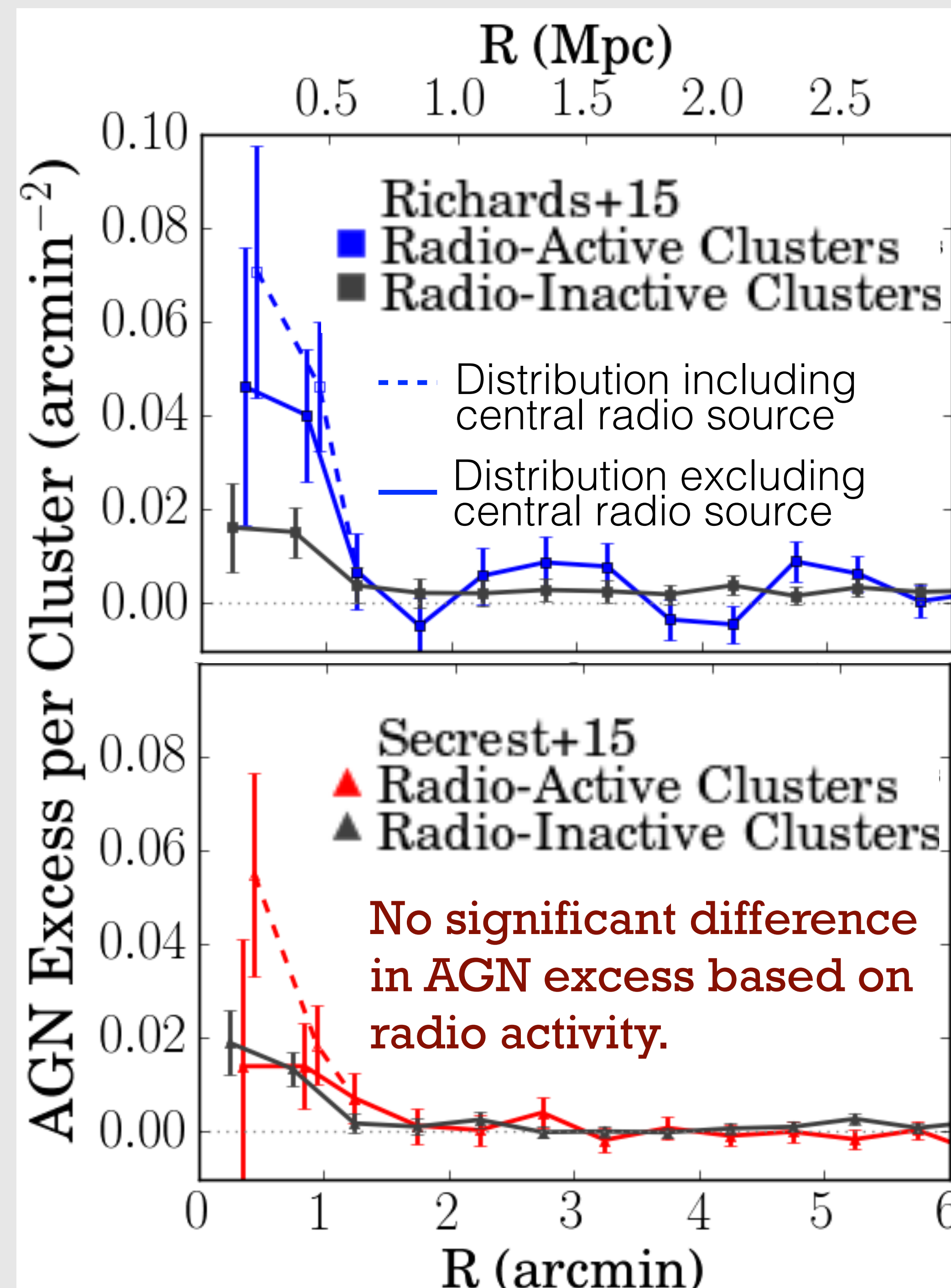
Divide 507 galaxy clusters with richness estimates by mass.



AGN Fueling via cold gas accretion more likely in low mass clusters. Radio-mode feedback important in high mass clusters.

Central Radio Activity

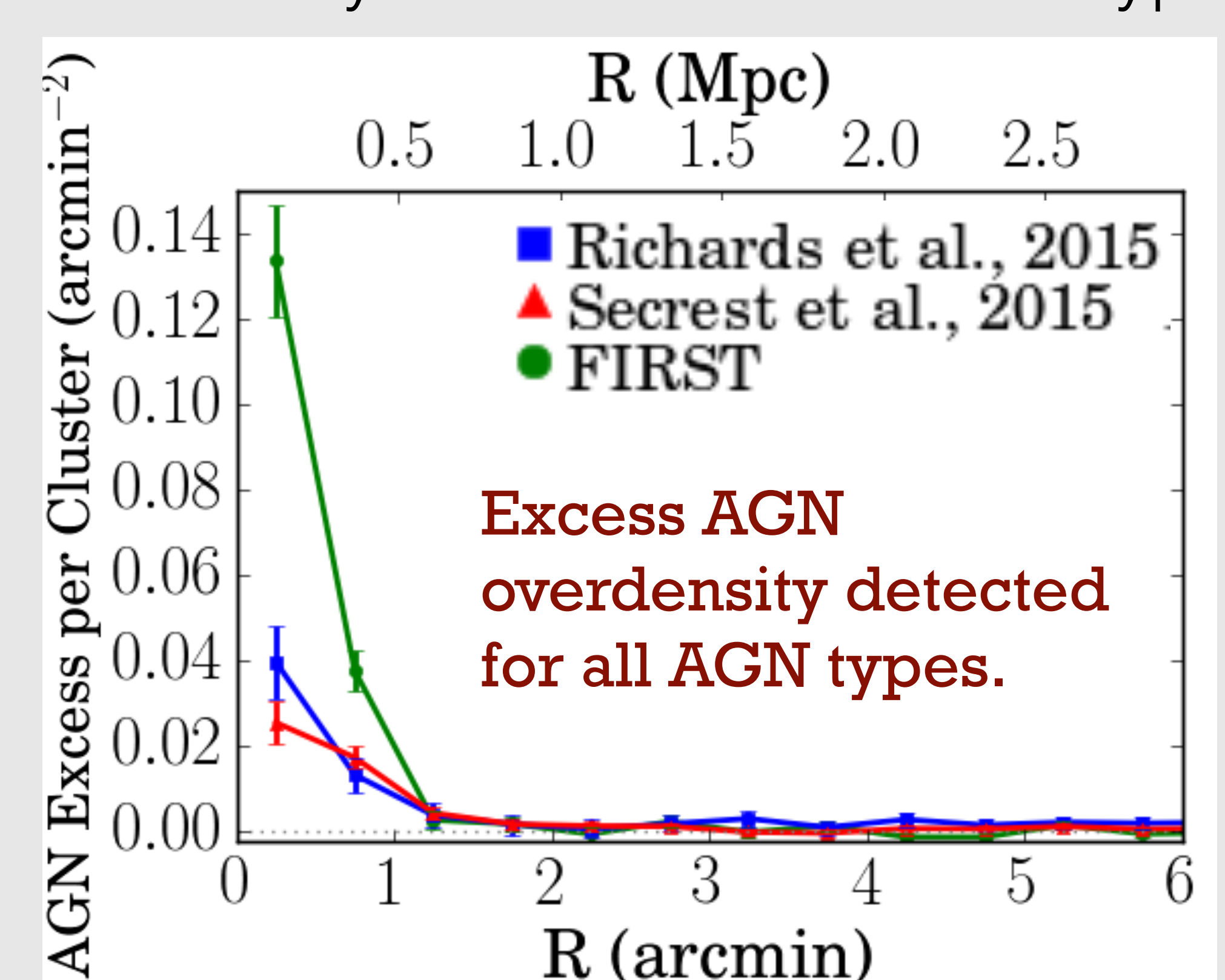
Compare 216 clusters with a radio source within $1'$ to clusters without.



Radio-mode feedback from central cluster radio source does not significantly impact the rate of AGN triggering.

AGN Selection

Study the relative amplitudes of AGN overdensity as a function of AGN type.



Radio-selected AGN more concentrated towards cluster center than optical or mid-IR selected AGN.

References

Becker, R. H., White, R. L., & Helfand, D. J. 1995, ApJ, 450, 559
Richards, G. T., Myers, A. D., Peters, C. M., et al. 2015, ApJS, 219, 39
Secret, N. J., Dudik, R. P., Dorland, B. N., et al. 2015, ApJS, 221, 12

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MaDCoWS