Distant clusters in the XMM LSS survey

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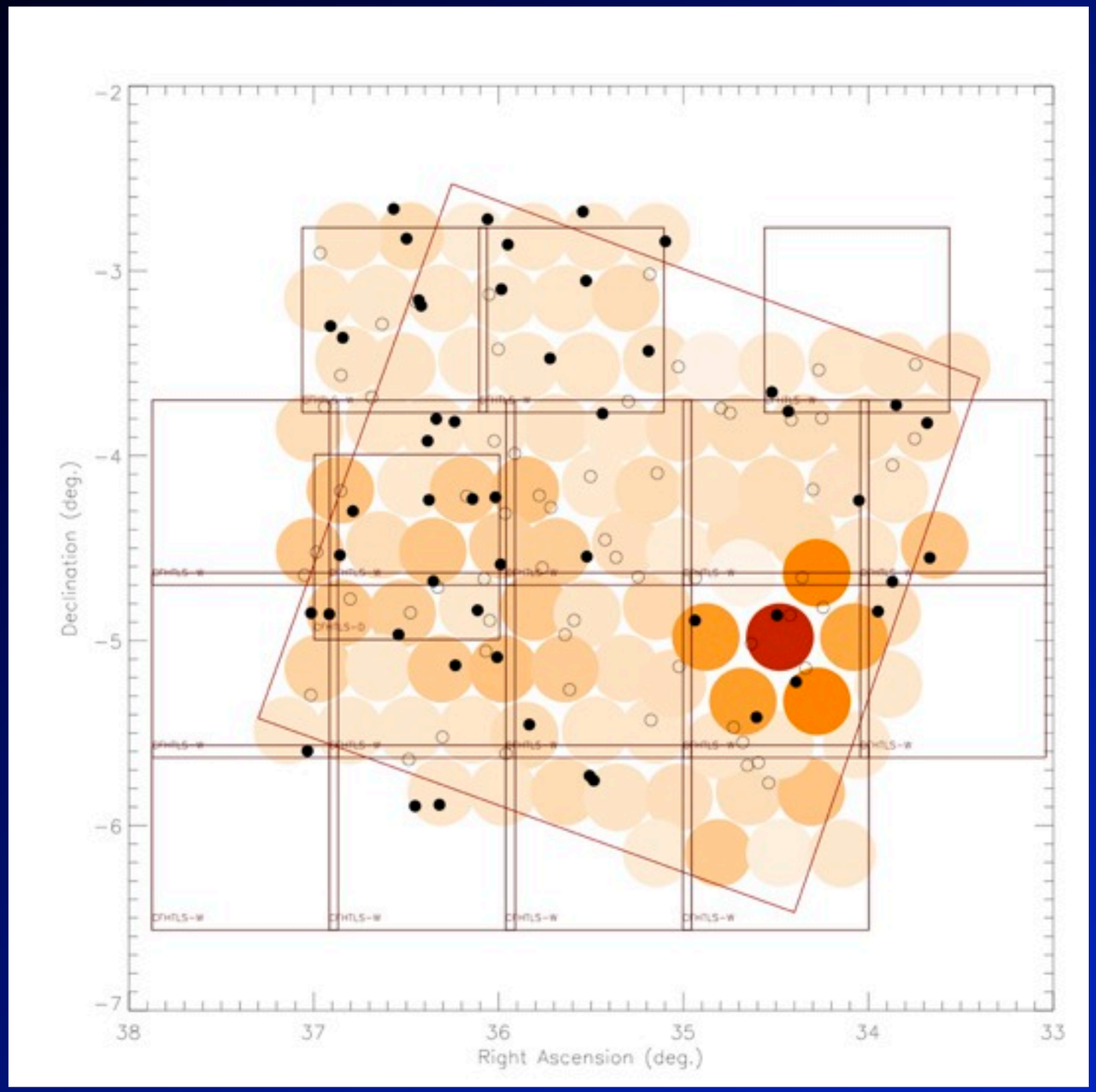
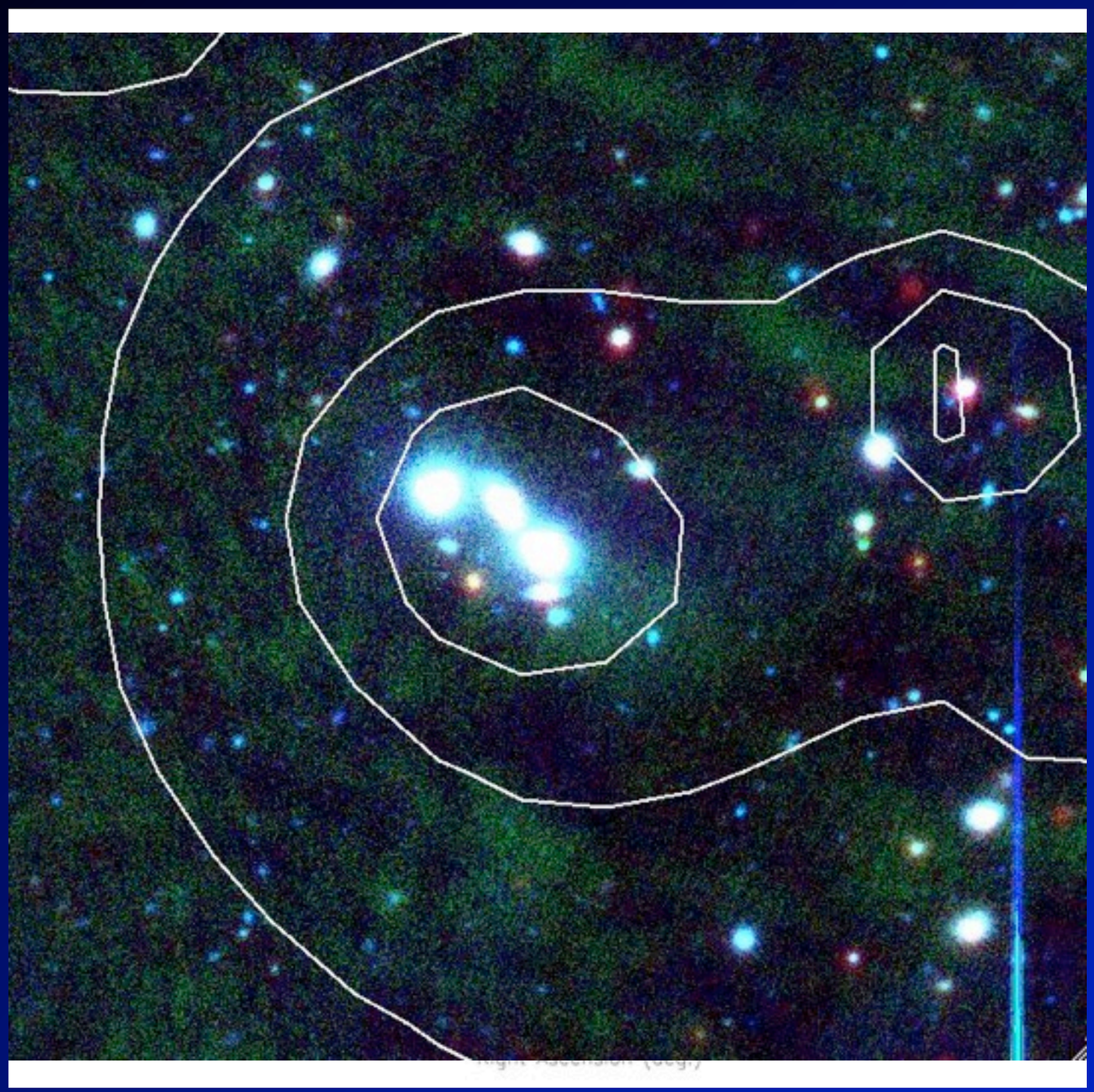
A complete X-ray selected distant cluster sample

- Aim: a complete survey of z>0.8 X-ray clusters with a well-defined selection function.
- XMM-LSS extended source catalogue (C1+C2) provides the ideal sample.
- Quantitative probe of high redshift structure formation.
- A complete sample of distant clusters (relatively) unbiased by the properties of the member galaxy population.
- Completed: we have identified 20 z>0.8 confirmed and candidate clusters in a 9 deg^2 sub-region of the XMM-LSS survey.
- Incomplete: bright and faint AGN introduce additional astrophysics into the XMM-LSS selection function.
- The 50 deg^2 XXL survey (in progress) will greatly extend this work.



- 9 deg^2 XMM/CFHTLS/ SWIRE footprint
- 88 C1+C2 sources - 55 with redshifts
- Visual sorting of the remainder + galaxy overdensity analaysis
- 9 confirmed z>0.8 clusters and 11 candidates
- add deep YJHK data and compute photo-zs



rz3.6u

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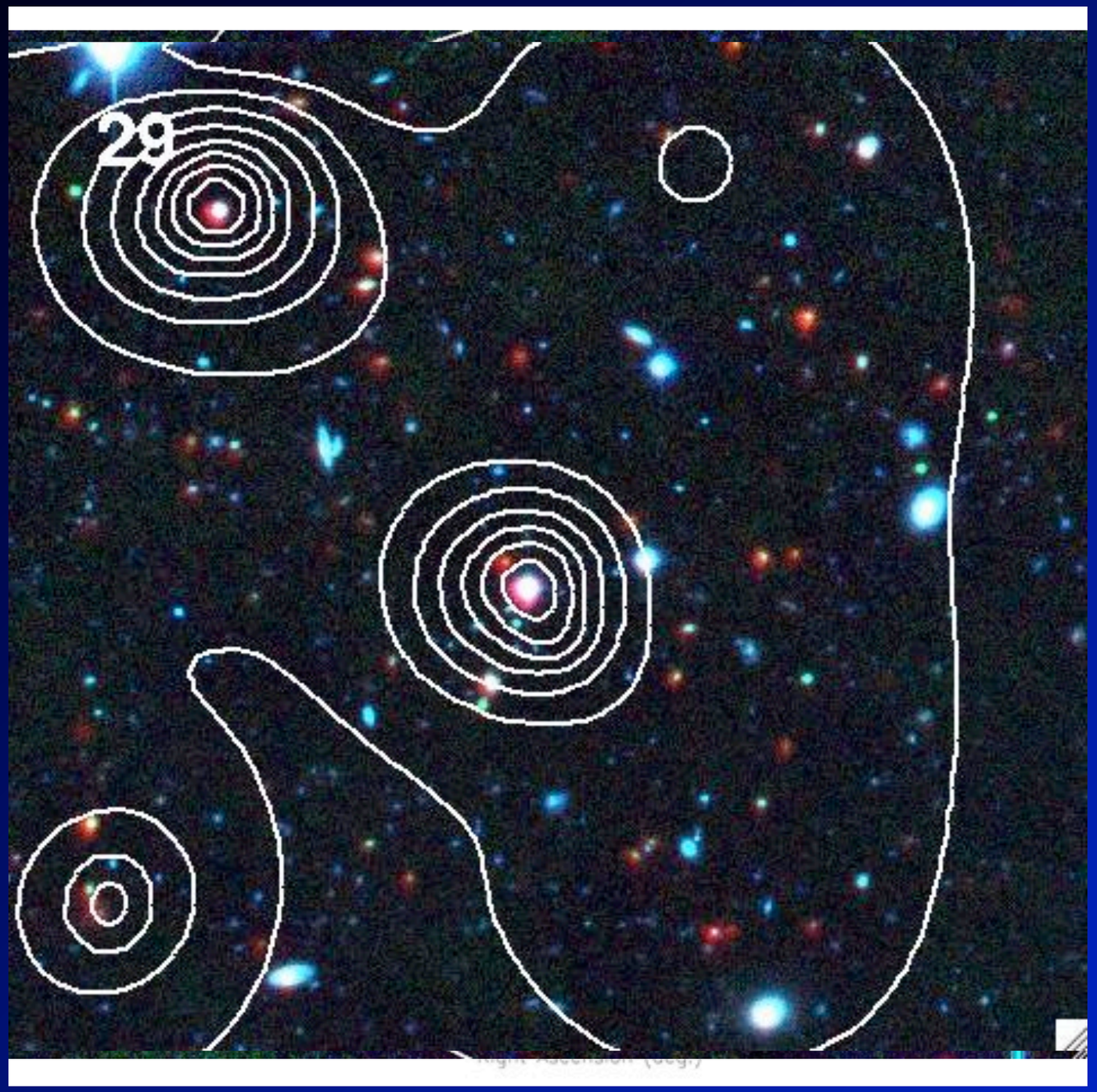

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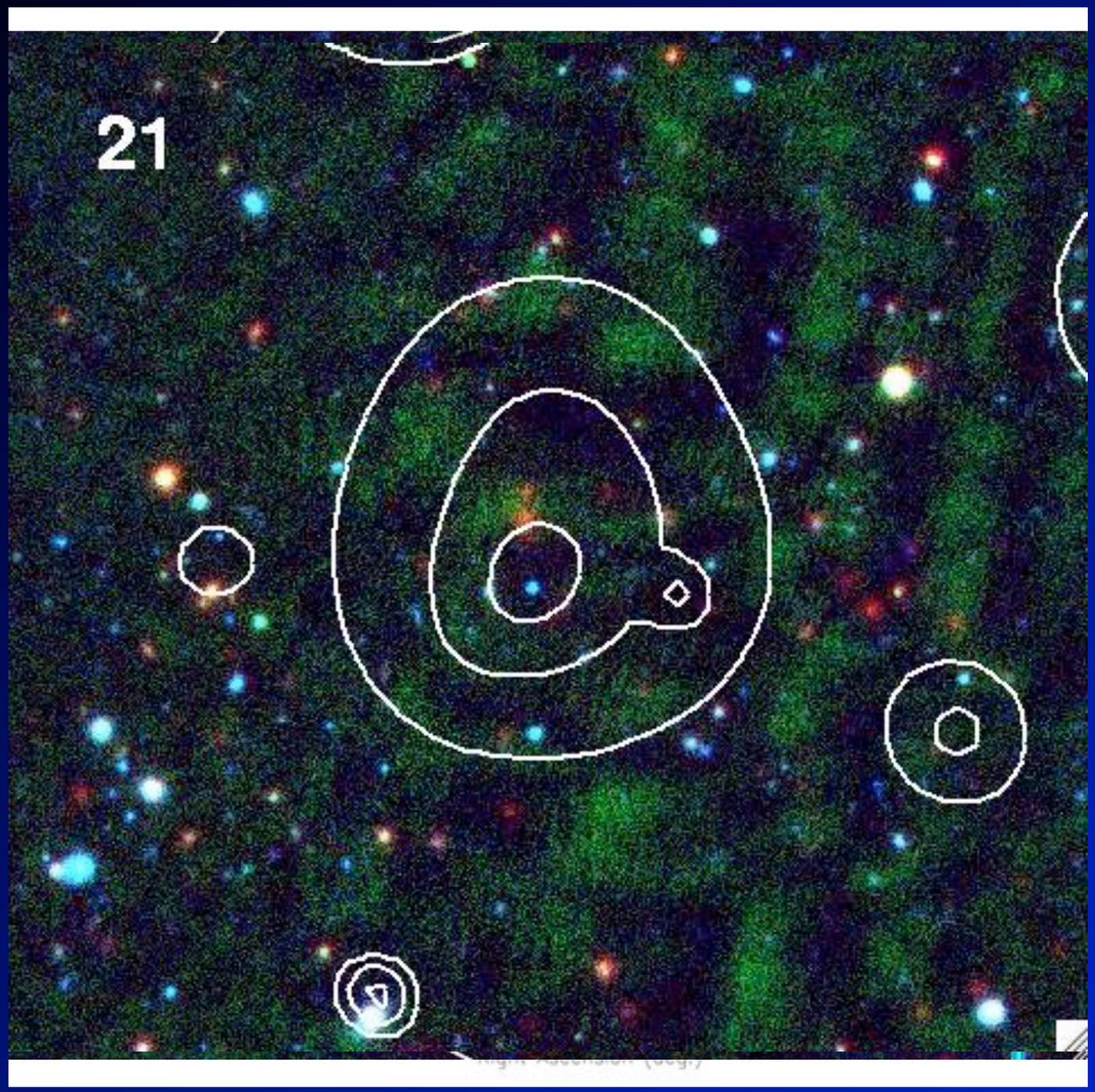

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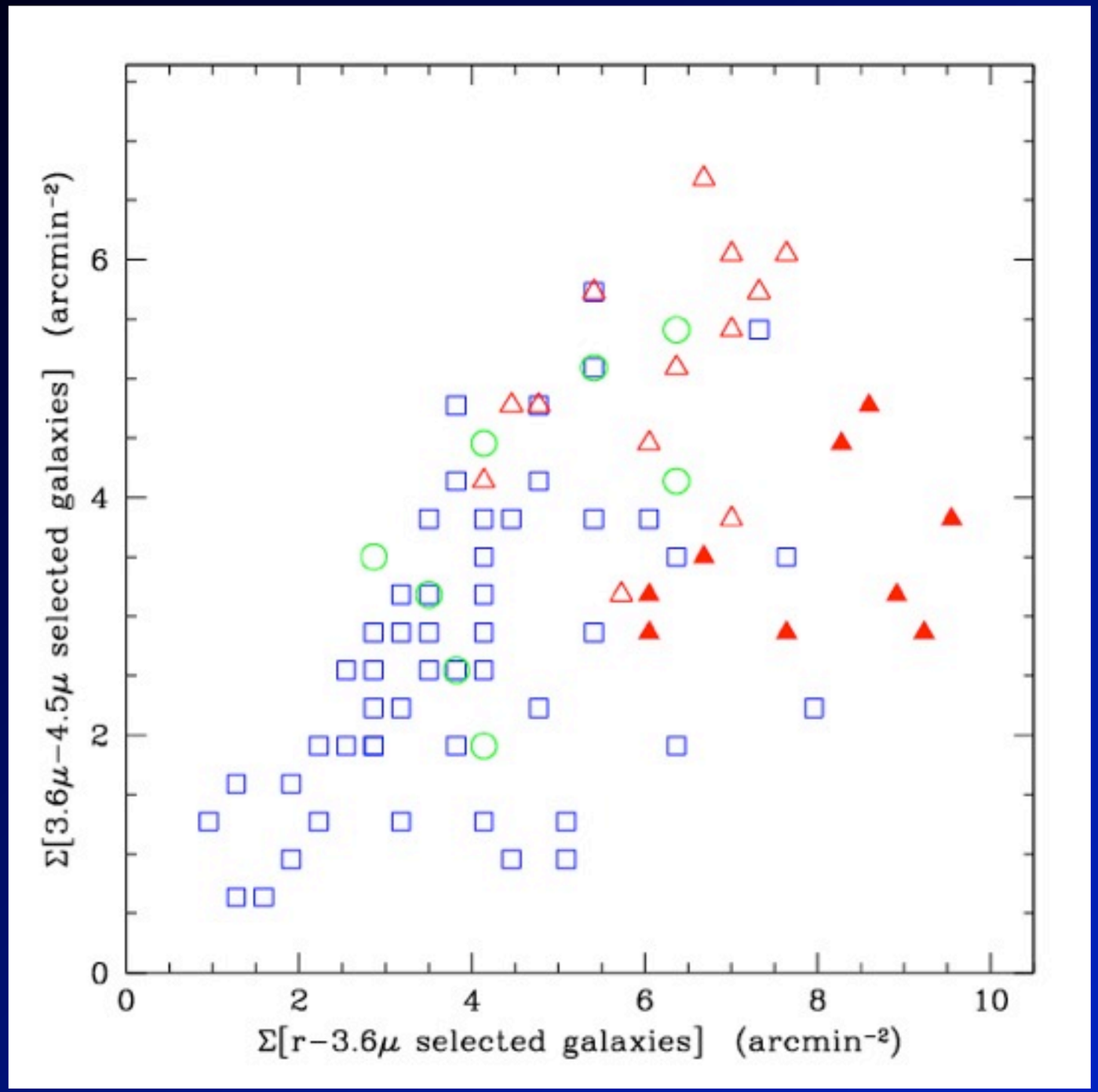

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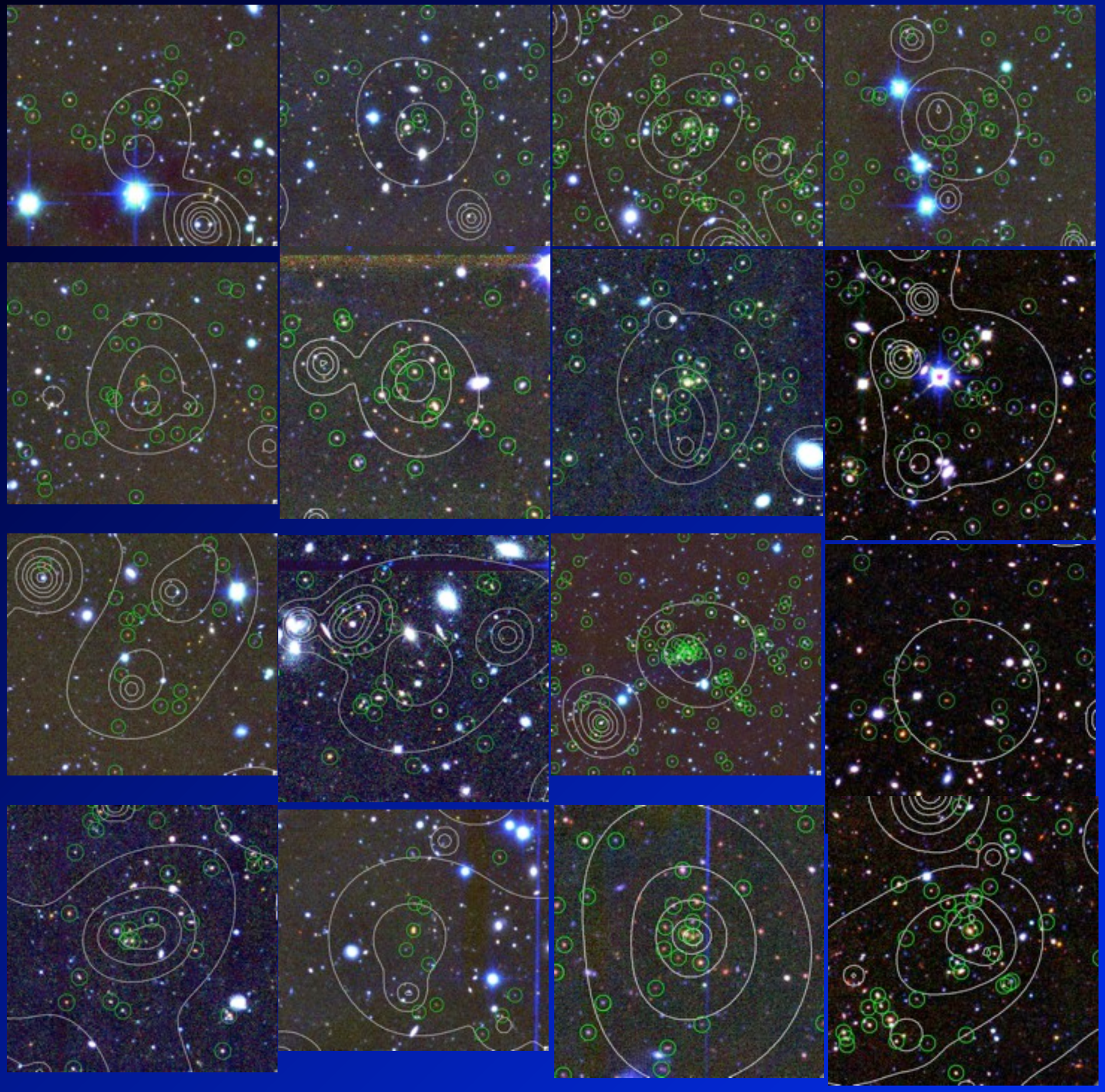
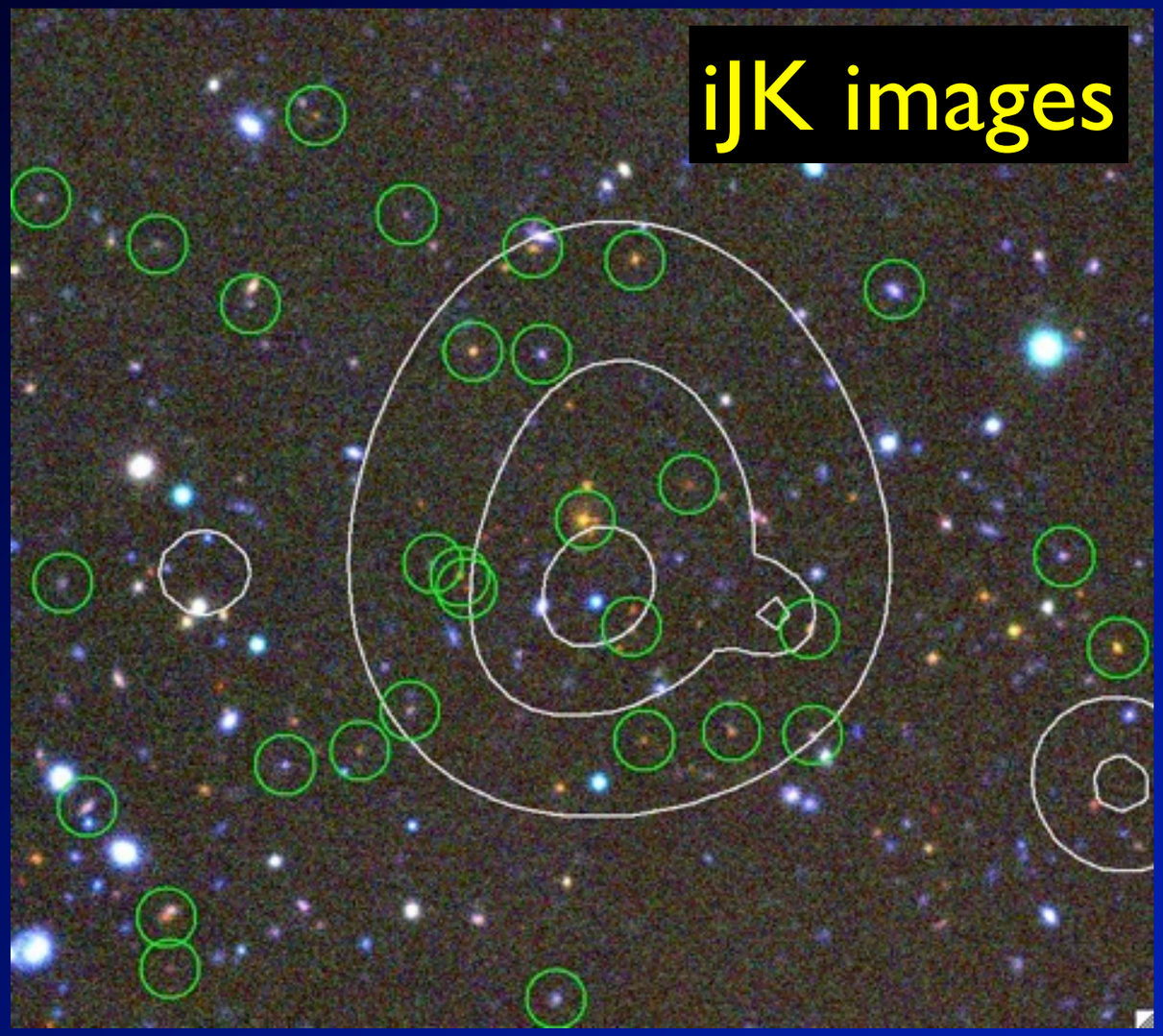
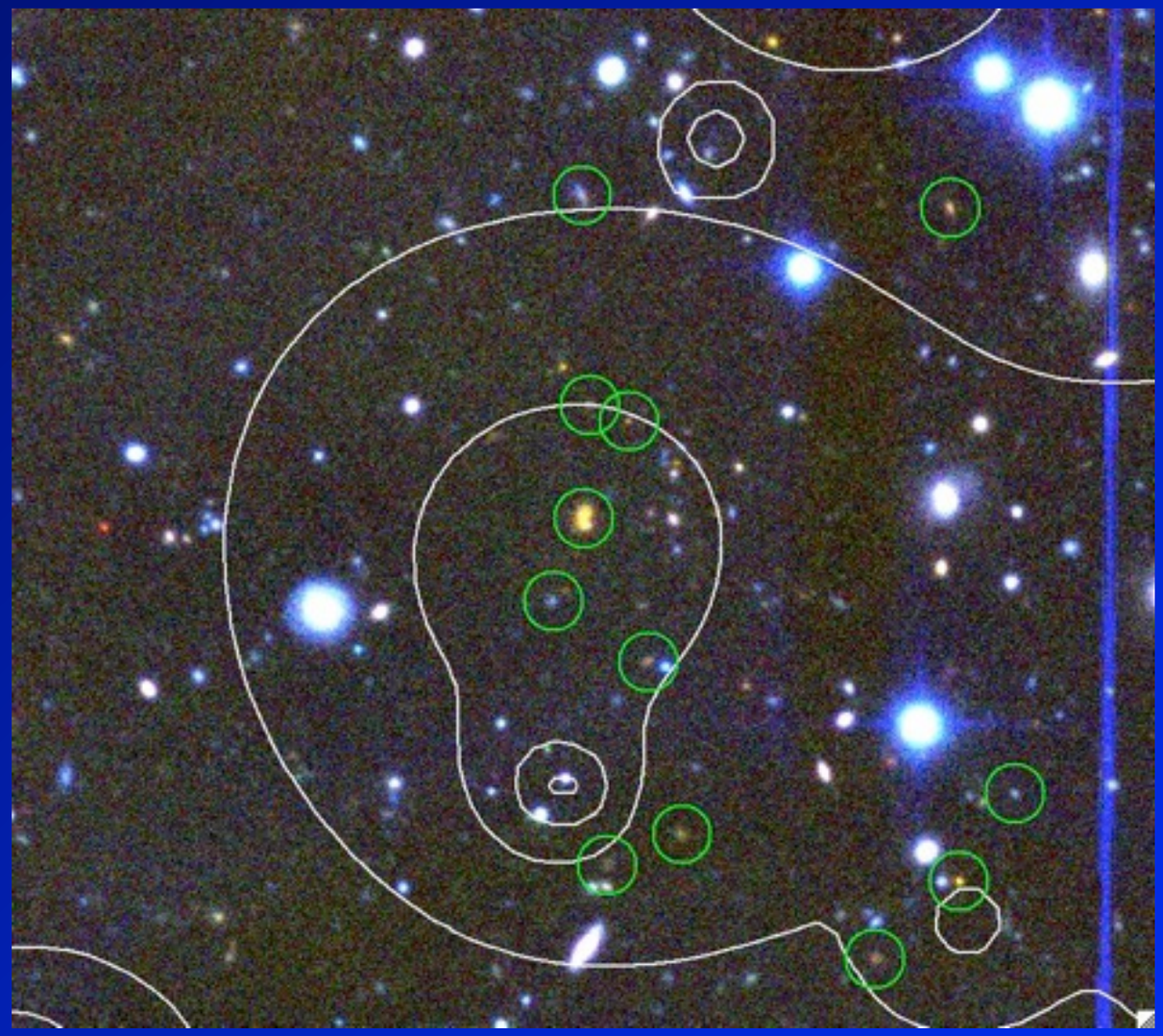


A tale of two clusters





z_{phot}=1.9

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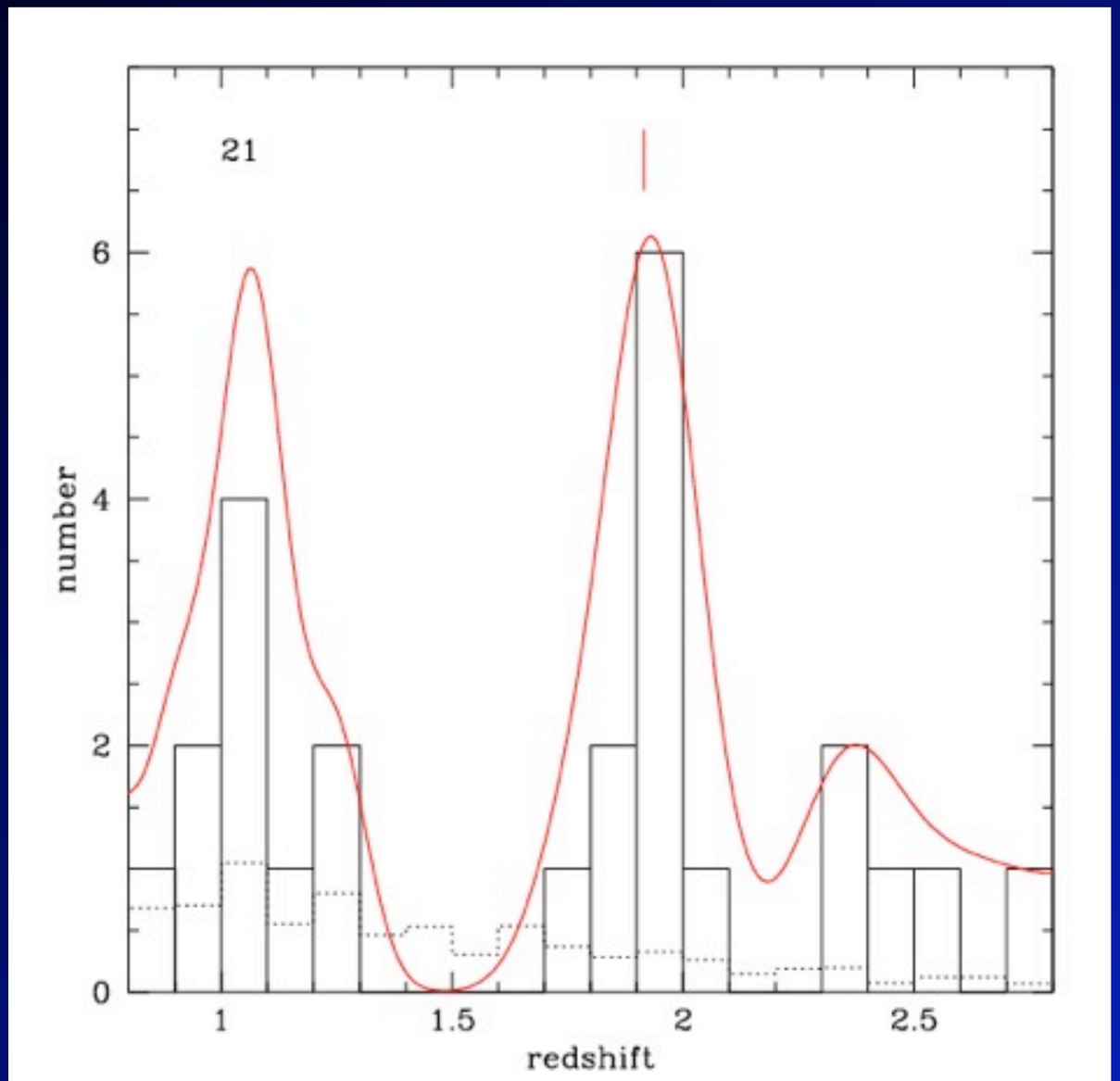

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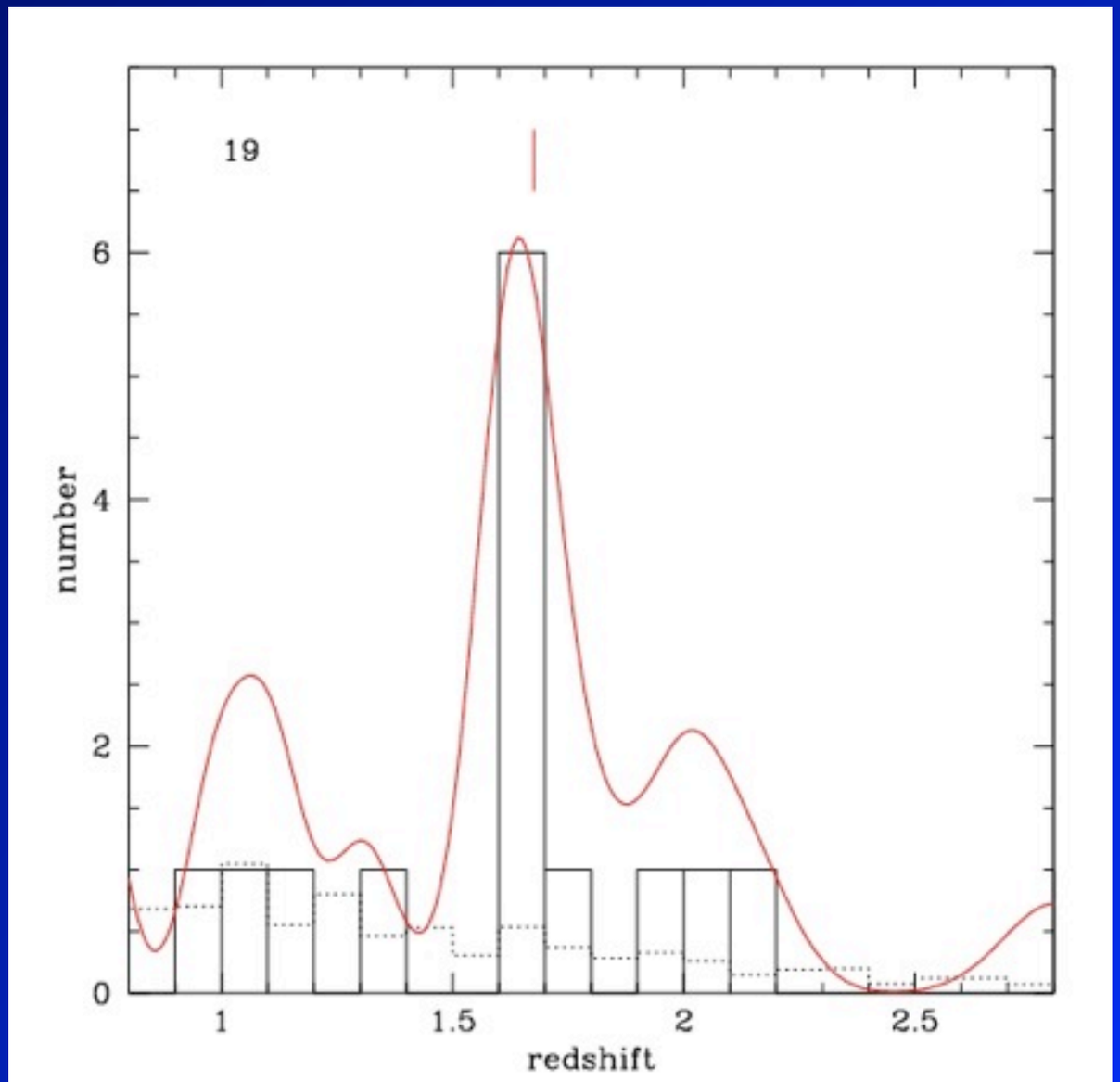

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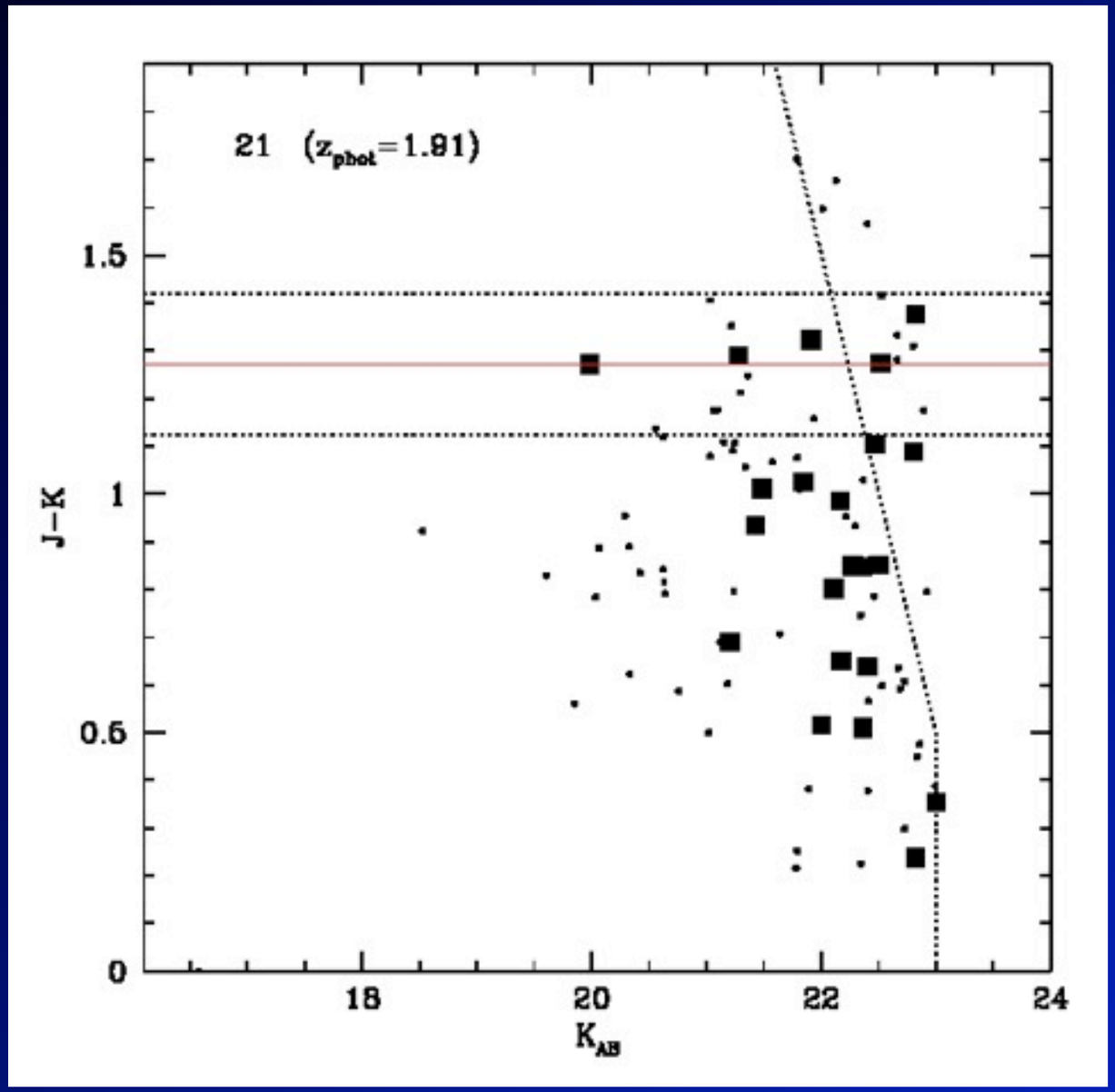

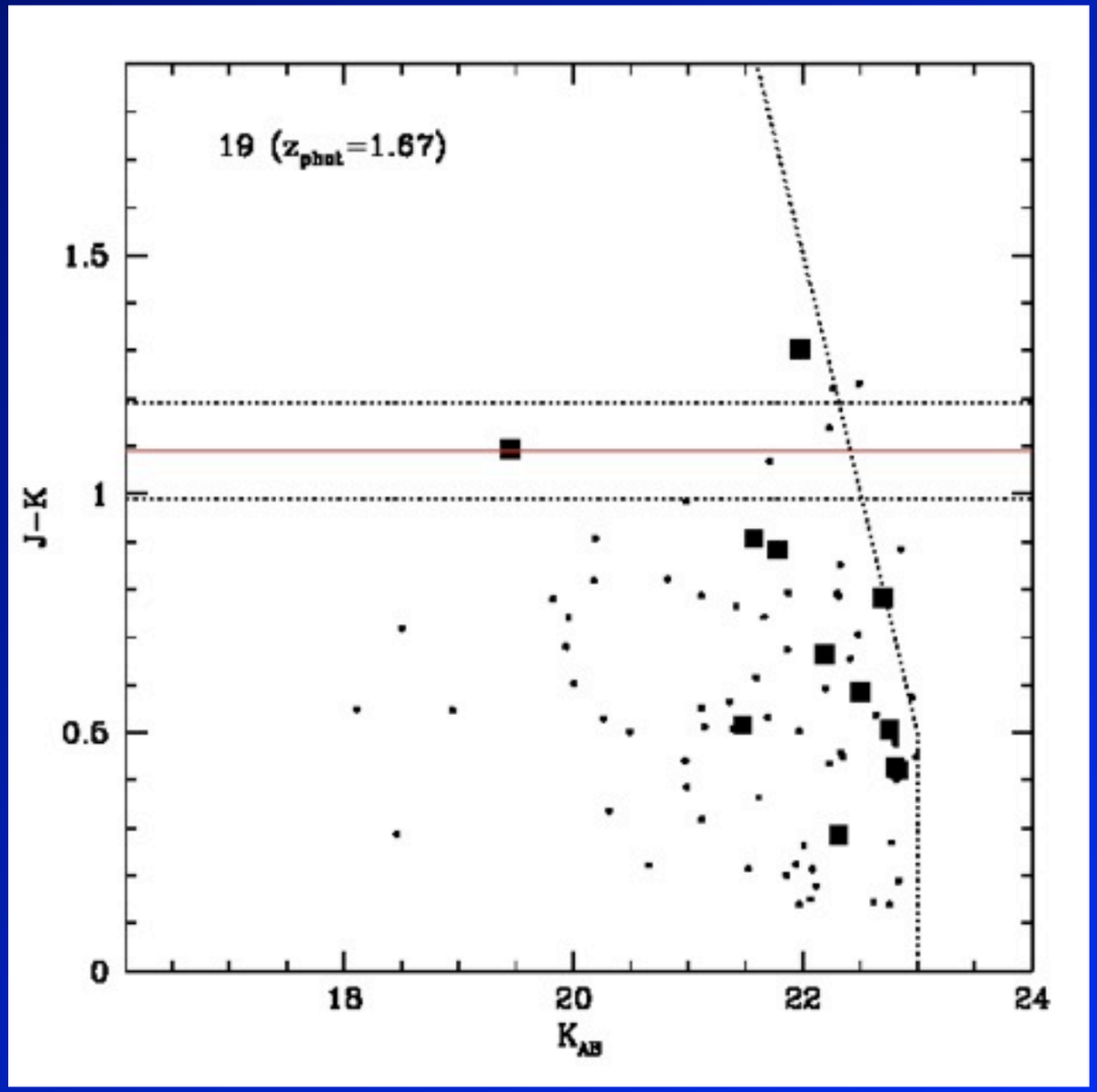

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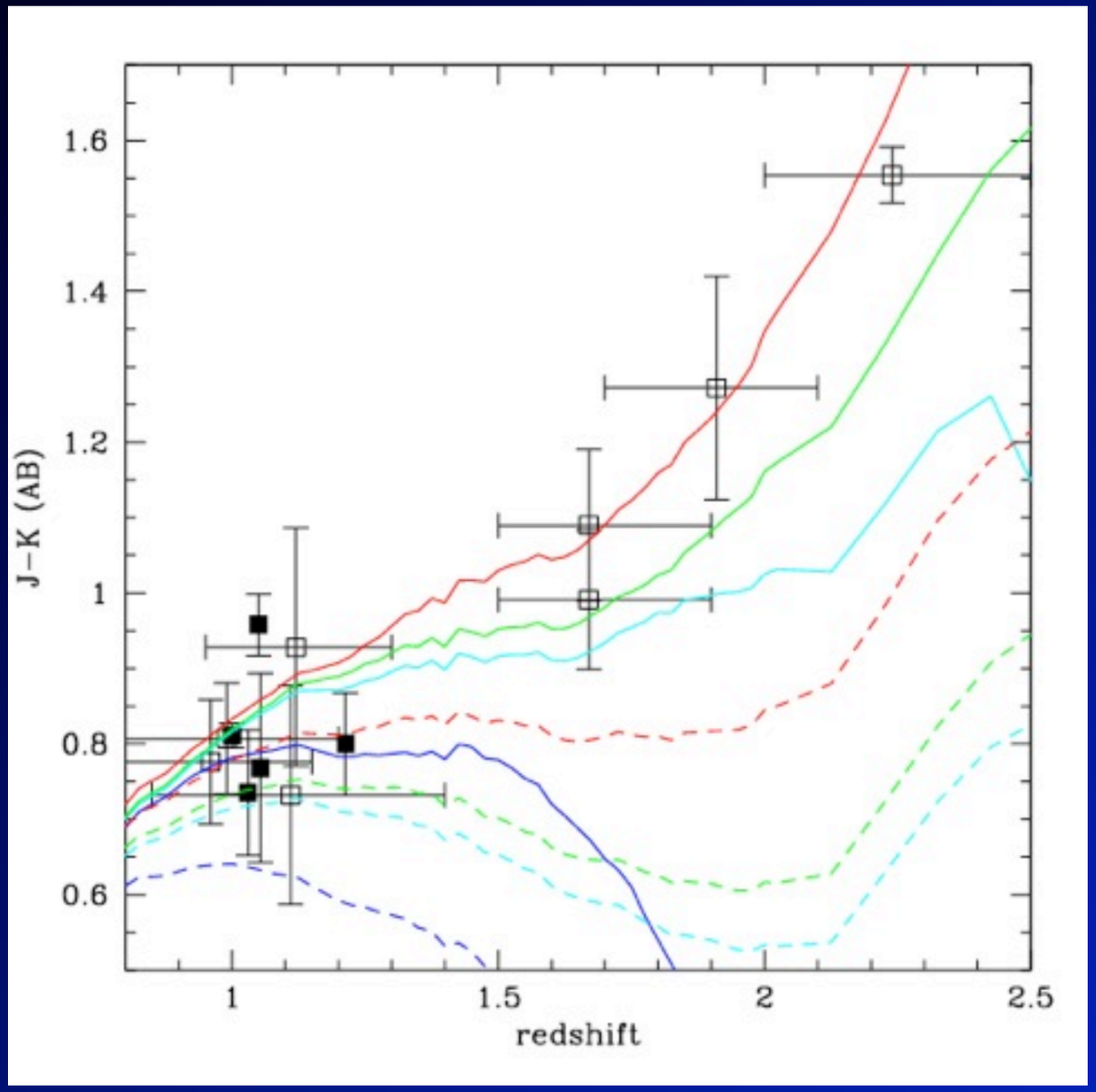
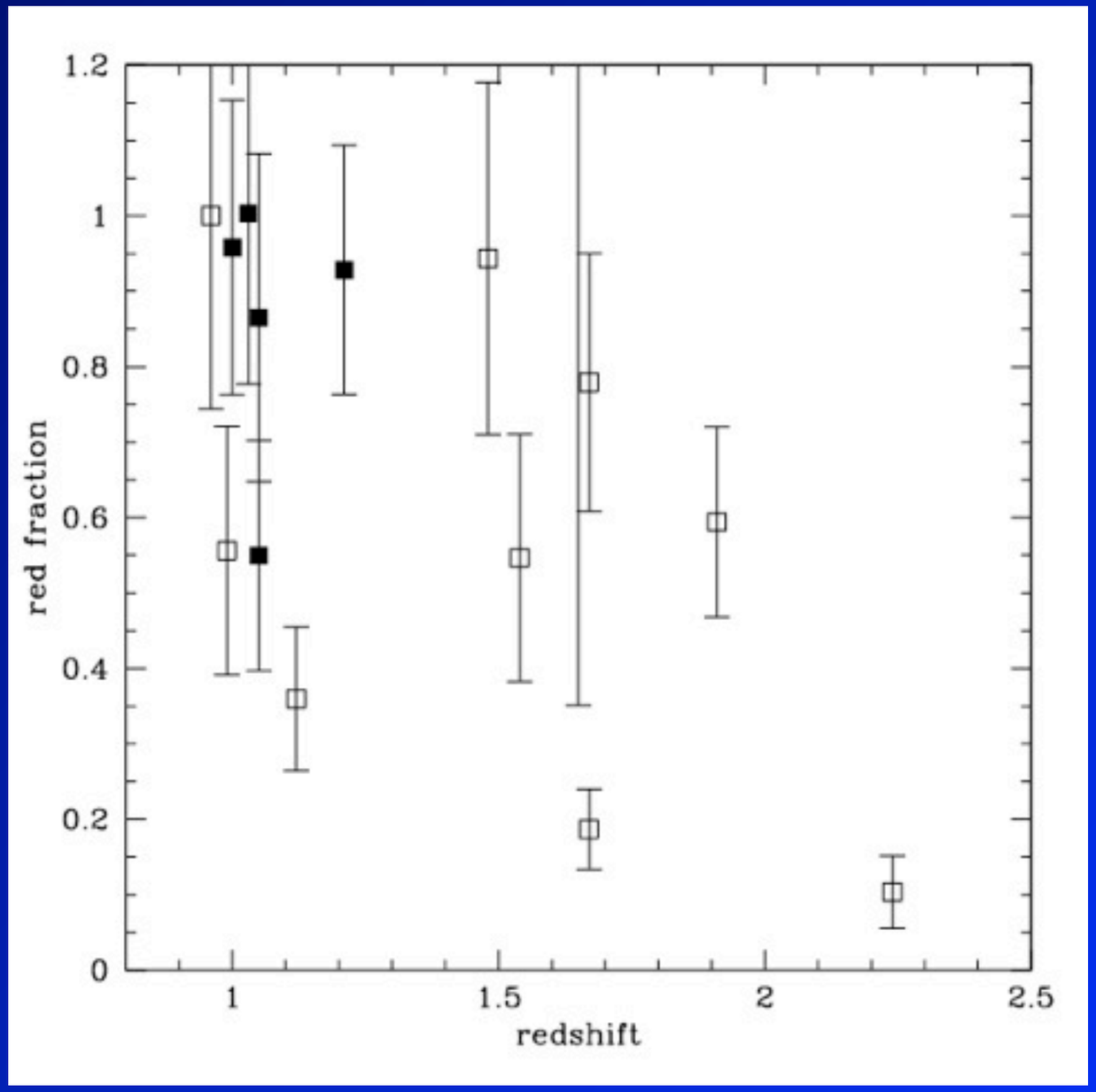
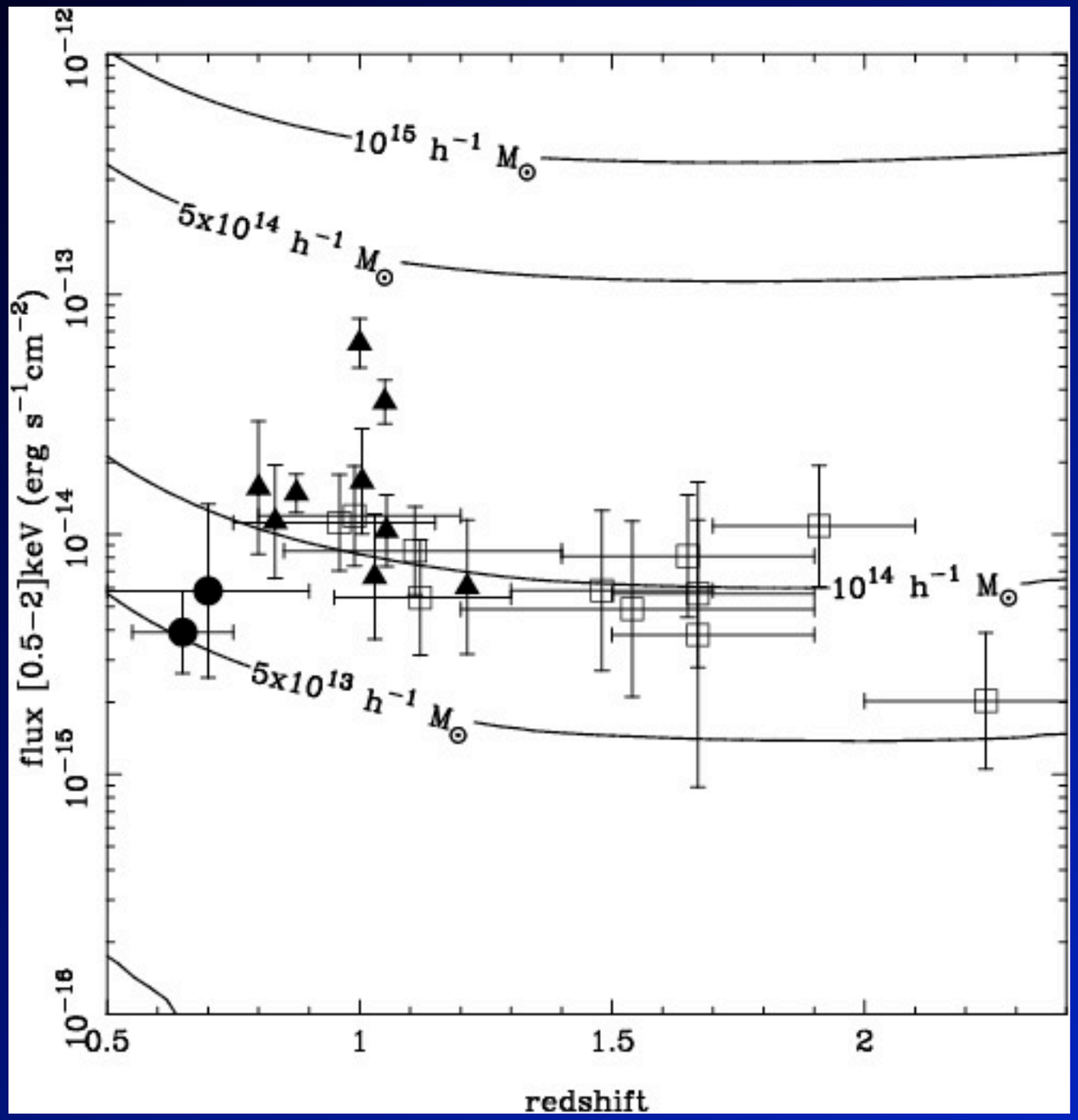
Red sequence ages and the red fraction





Distant cluster X-ray masses



- Use measured flux and (photo-) redshift
- Baseline model uses Arnaud & Evrard L-T, Arnaud, Pointecouteau & Pratt M-T plus self-similar evolution
- Masses ~10^{14} M_{solar}
- Varying the scaling relation model causes masses to vary by up to one order of magnitude

Conclusions

- The XMM-LSS distant cluster sample is complete yet incomplete.
- XMM-LSS has generated a sample of 20 z>0.8 extended X-ray clusters (9 confirmed 11 photo-z candidates). Willis et al. 2012 (MNRAS, submitted).
- The XMM-LSS C1+C2 selection function is well determined and this sense the distant cluster sample is complete.
- However, the role of faint AGN in blurring the surface brightness selection boundary is still being investigated.
- Furthermore, we have noted examples where bright AGN within a massive distant cluster result in the X-ray source being labelled as point-like. Understanding the abundance of such sources down to the same mass limit as the extended source sample is challenging.
- The 50 deg^2 XXL survey will greatly extend this work.