Weak lensing signal of Voronoi-selected galaxy clusters undetected by red-sequence algorithm

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Outline

- Review of the data:

  - Source catalogs: CS82
  - Clusters catalogs: Redmapper and Voronoi-Tessellation

- Revising the matching

  - Sample definitions
  - WL measurements

- Preliminary results

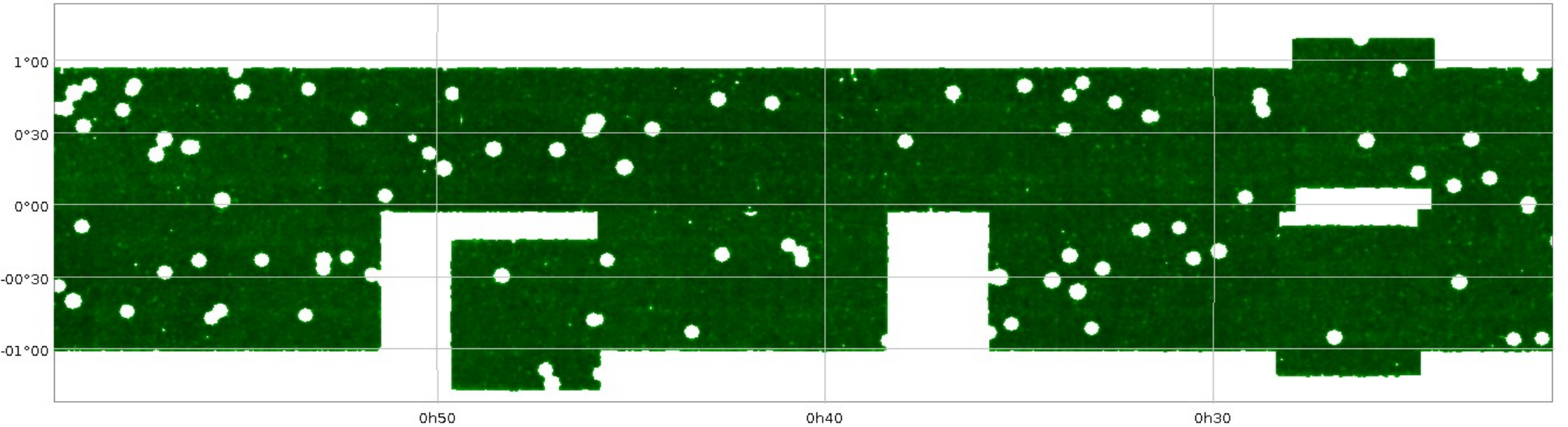
  - Matched and unmatched samples

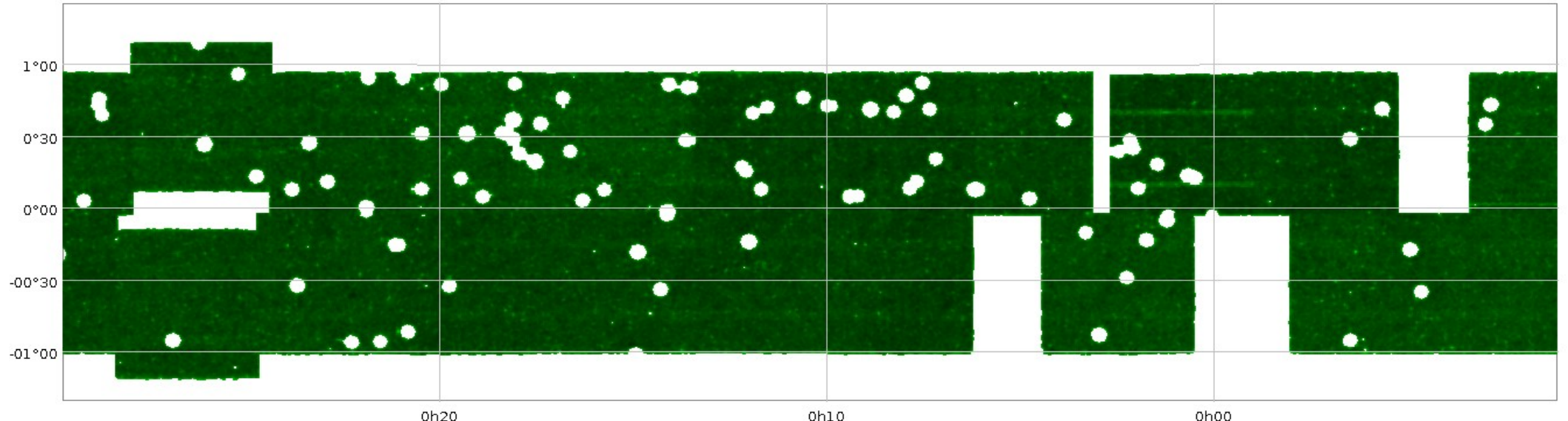
- Perspectives

  - Unmatched sample tests: real mass? Study of the member populations?

Data: source catalogs

- CFHT Stripe 82 Survey (CS82): 17.410.102 objects, excellent image quality
- Masked regions for RM/VT and shapes for lensing

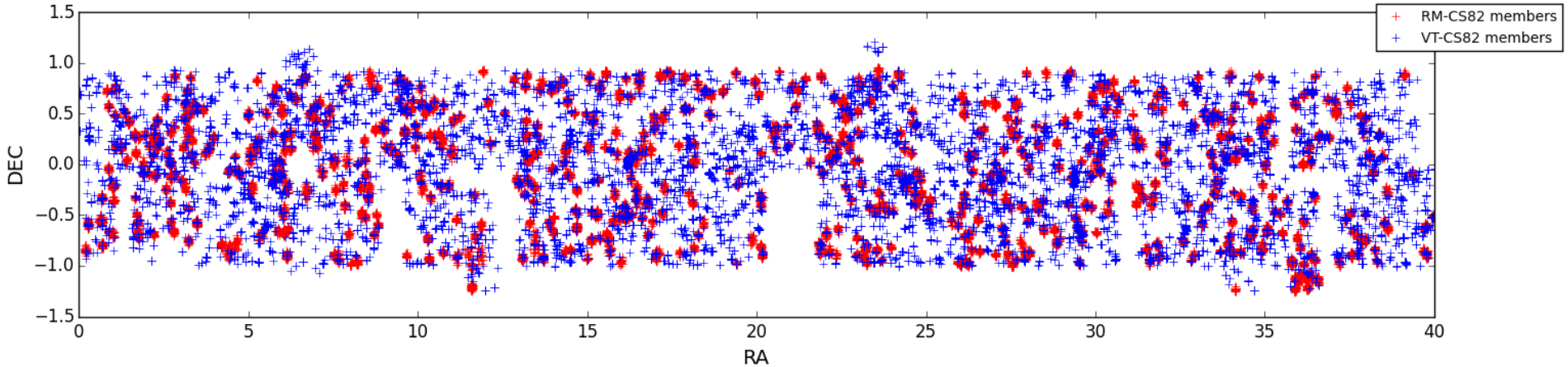


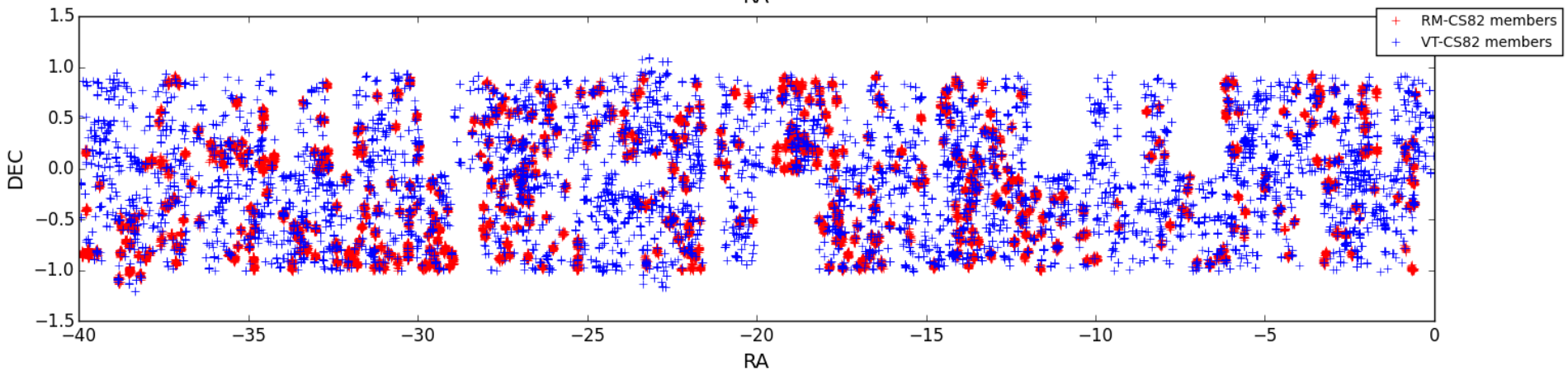


Data: cluster and member catalogs

- RM clusters catalog: 1.502 (λ>15)
- RM members catalog: 59.915
- VT clusters catalog: 19.706
- VT members catalog: 83.515

- After masks: 59.759 (RM-CS82) and 43.364 (VT-CS82)
- Matching radius: 0.75 arcsec
- Clusters with members close to masks are not used in the matching





Matching: RM-CS82 with VT-CS82

- RM-CS82 matching VT-CS82: **2.706 members** (0.75 arcsec)
- VT-CS82 matching RM-CS82: **2.946 members** (0.75 arcsec)

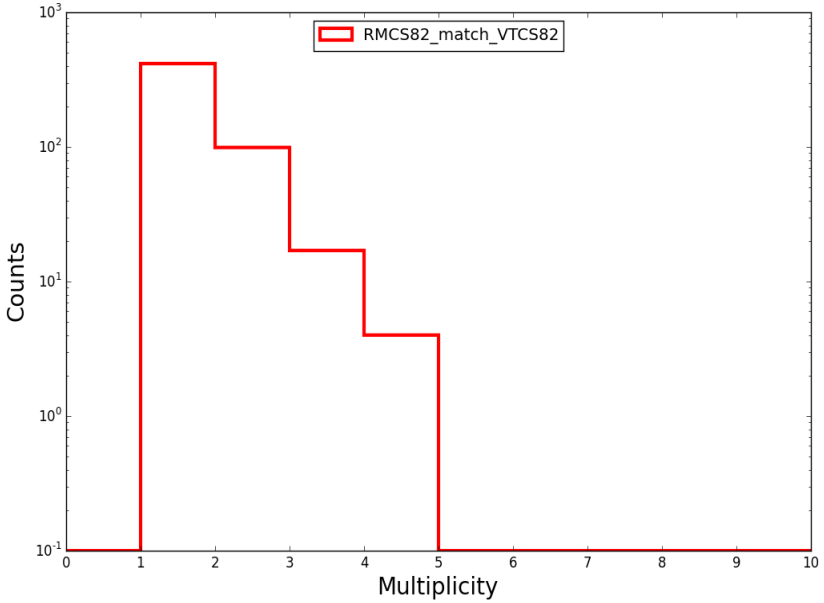
- Cuts in RM-CS82: $\lambda>15$, $z<0.75$ → 2.361 members → **536** clusters
- Cuts in VT-CS82: nvt>15, $z<0.75$ → 2.418 members → **100** clusters

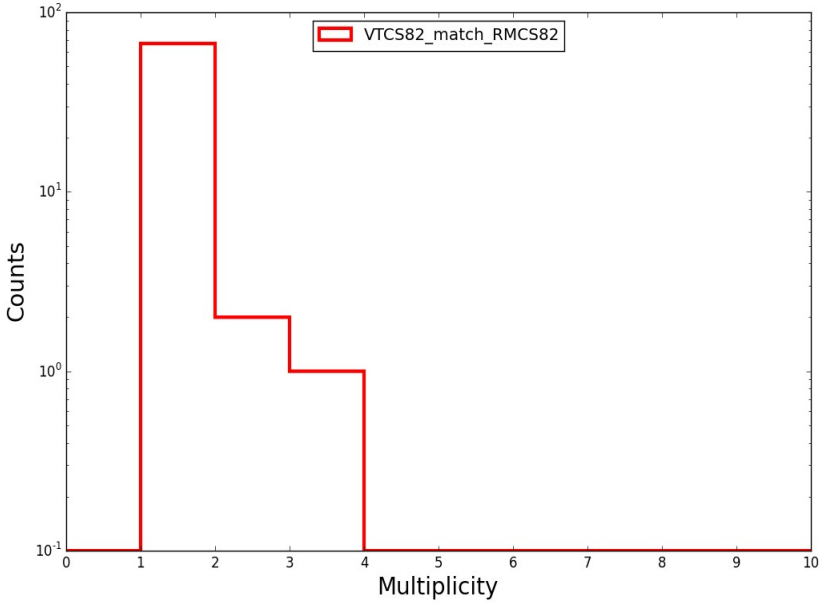
Matching procedure:

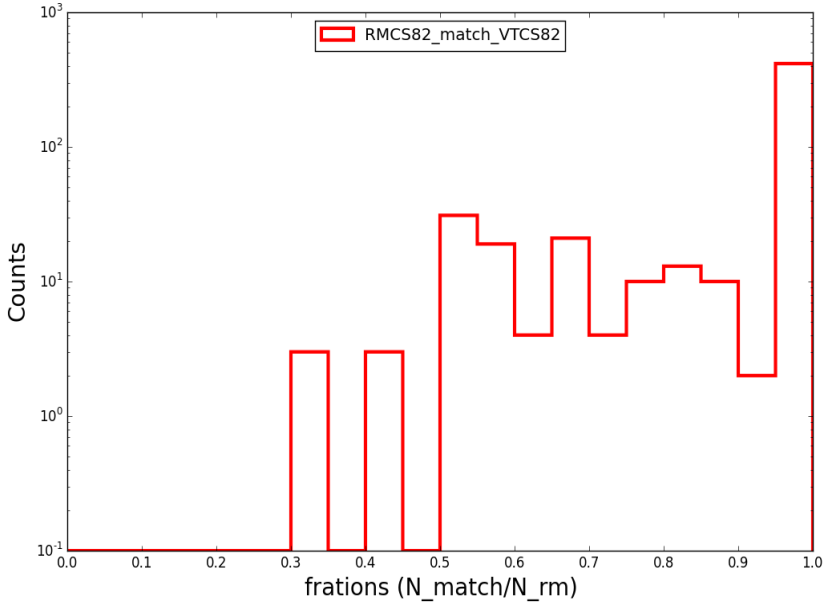
- computing fraction ($N_{match}/N_{rm/vt}$) of members between the catalogs
- clusters that share most of the members are matches + 50% fraction

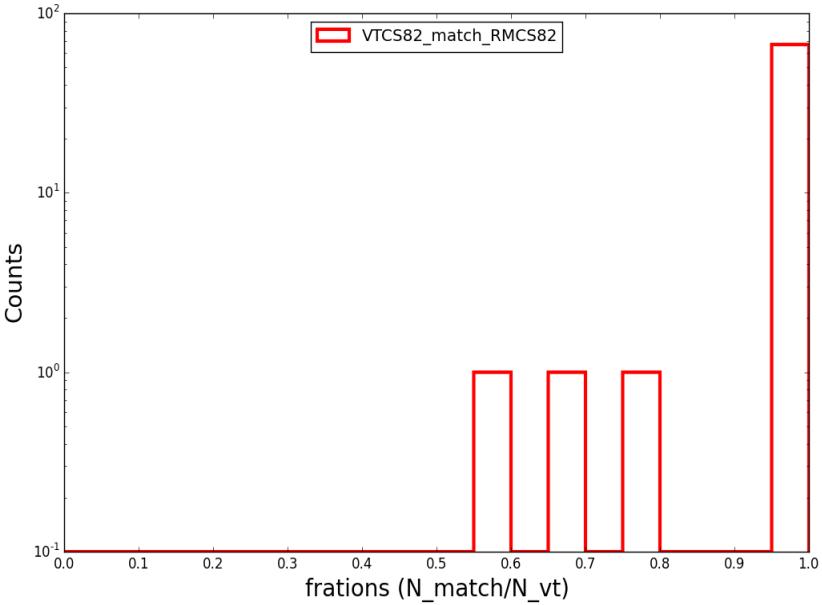
- RM-CS82 as reference: **58** matchings
- VT-CS82 as reference: **70** matchings

Preliminary results: matchings

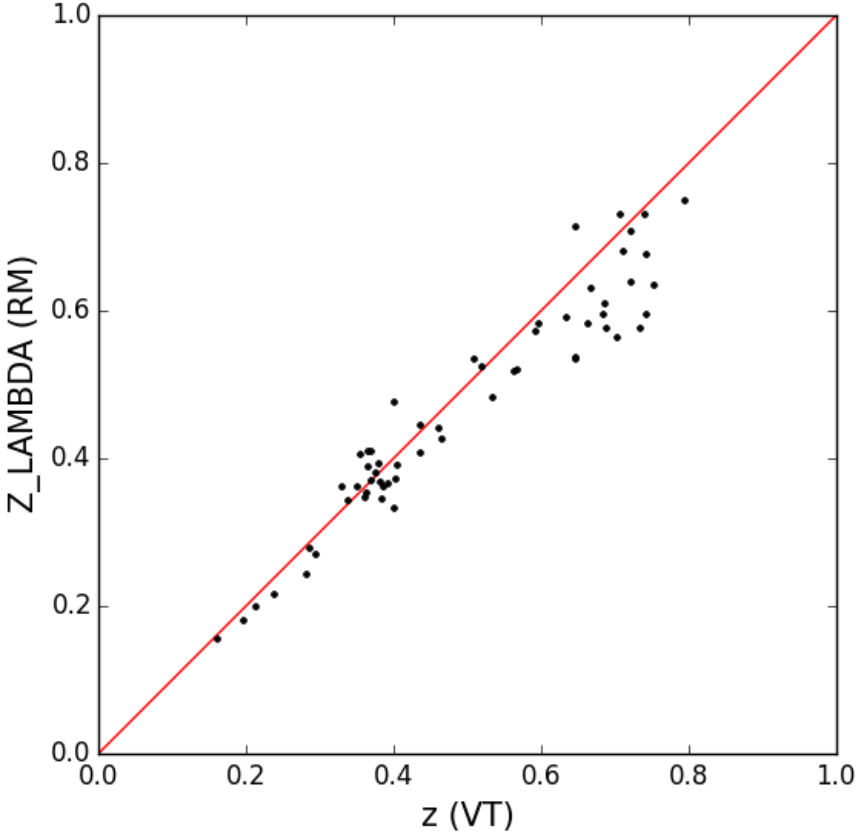


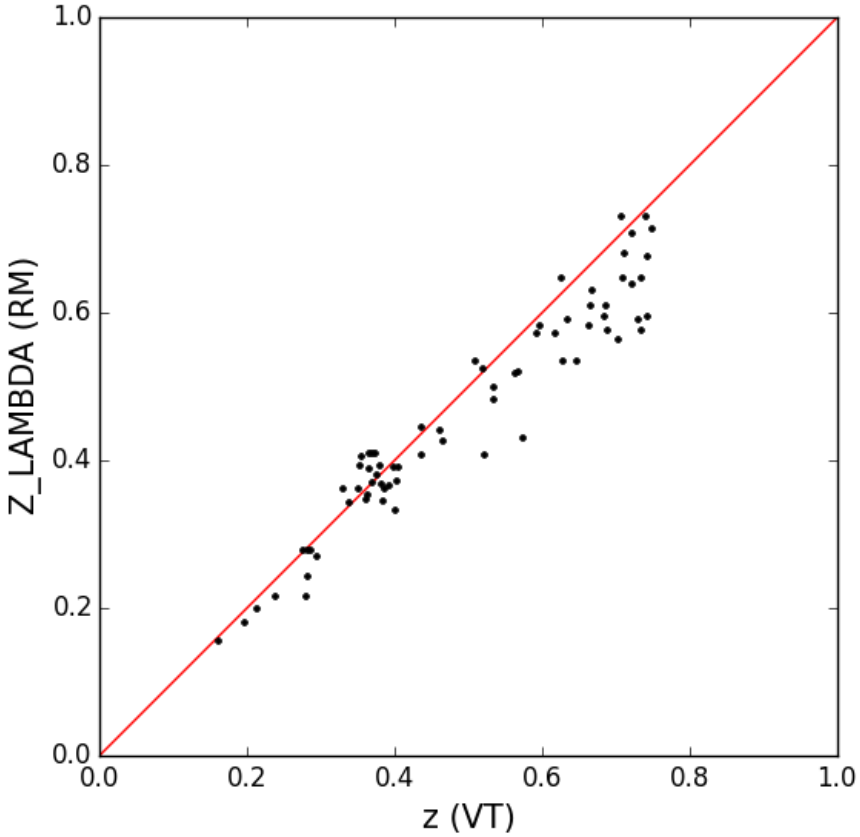






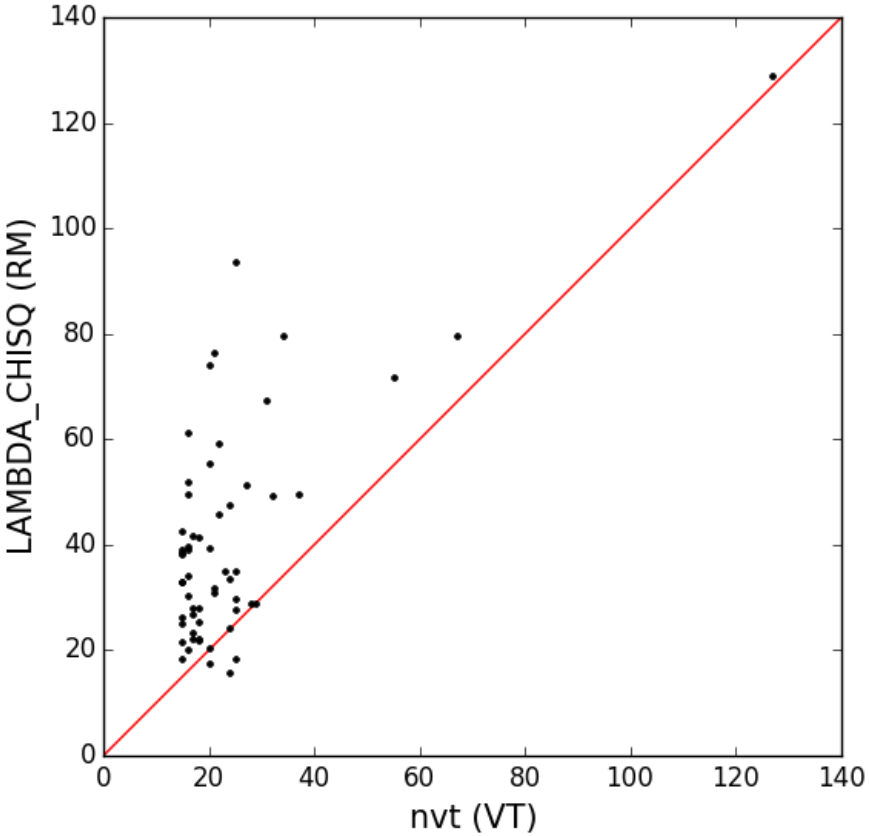
Preliminary results: redshifts

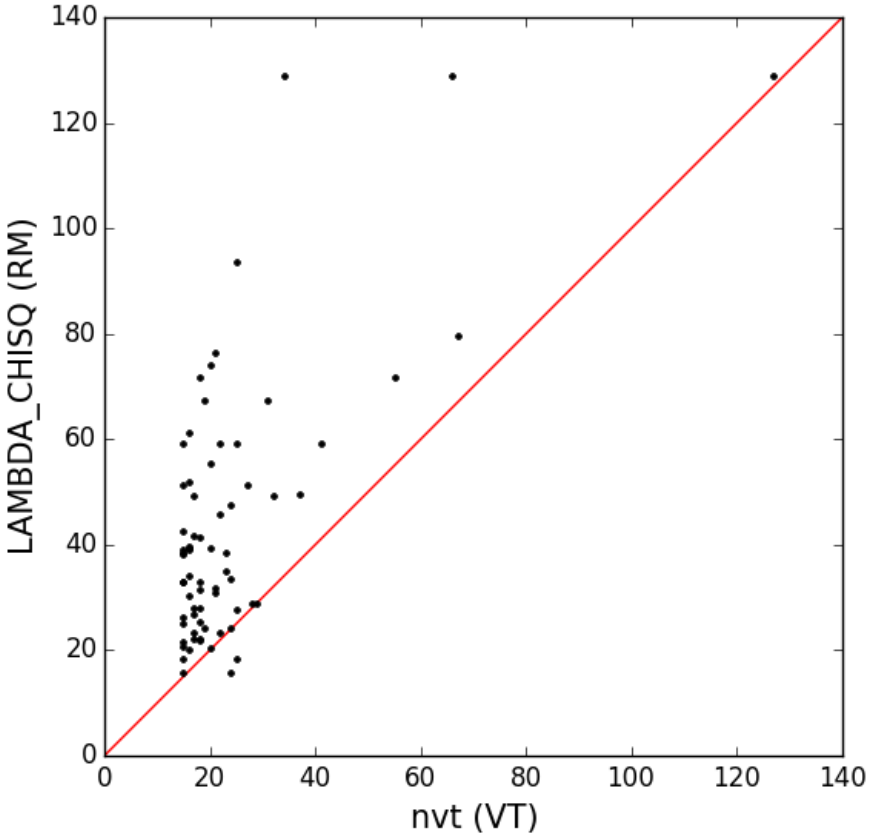




- Bias correction: 0.03 for VT-CS82 clusters

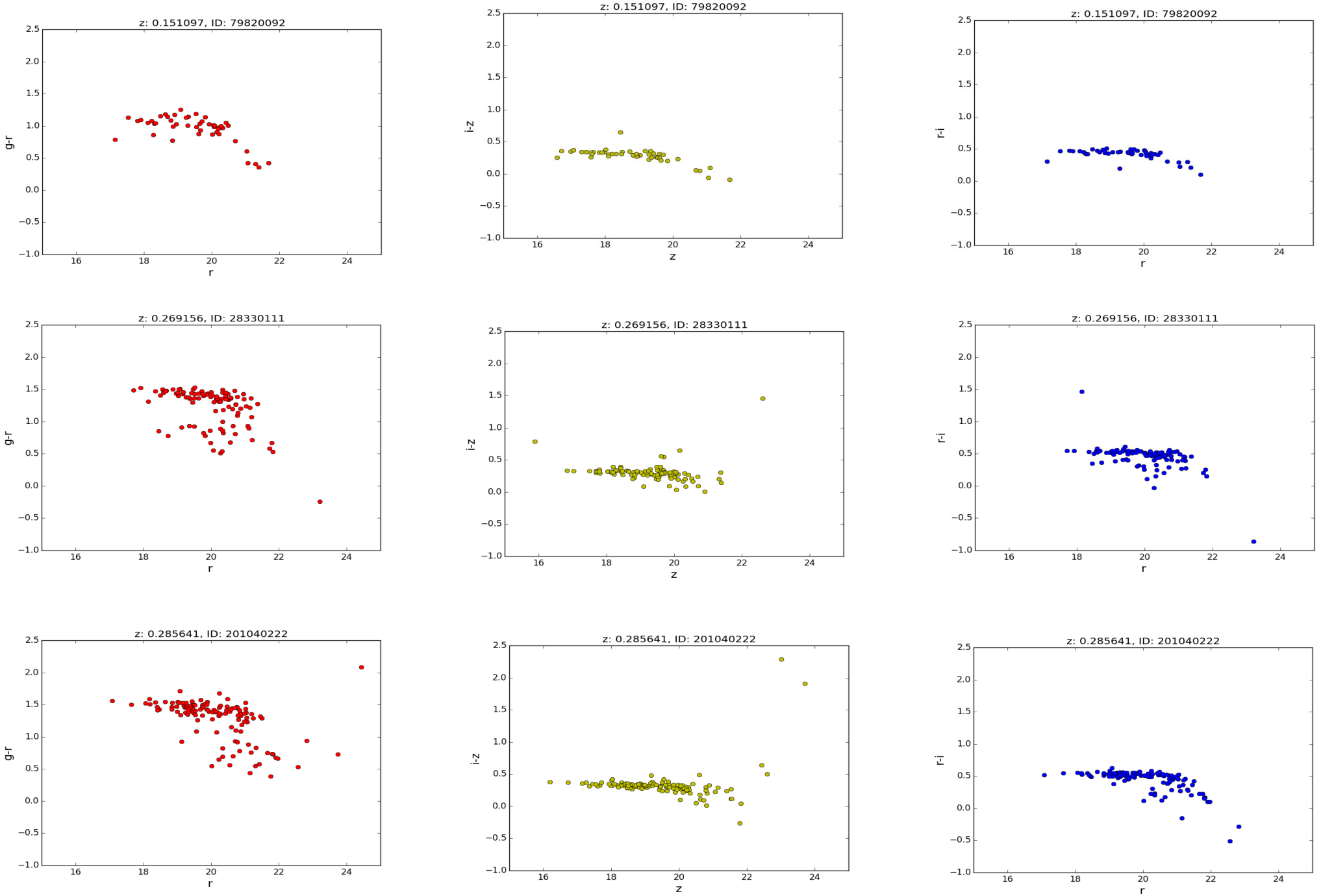
Preliminary results: richness



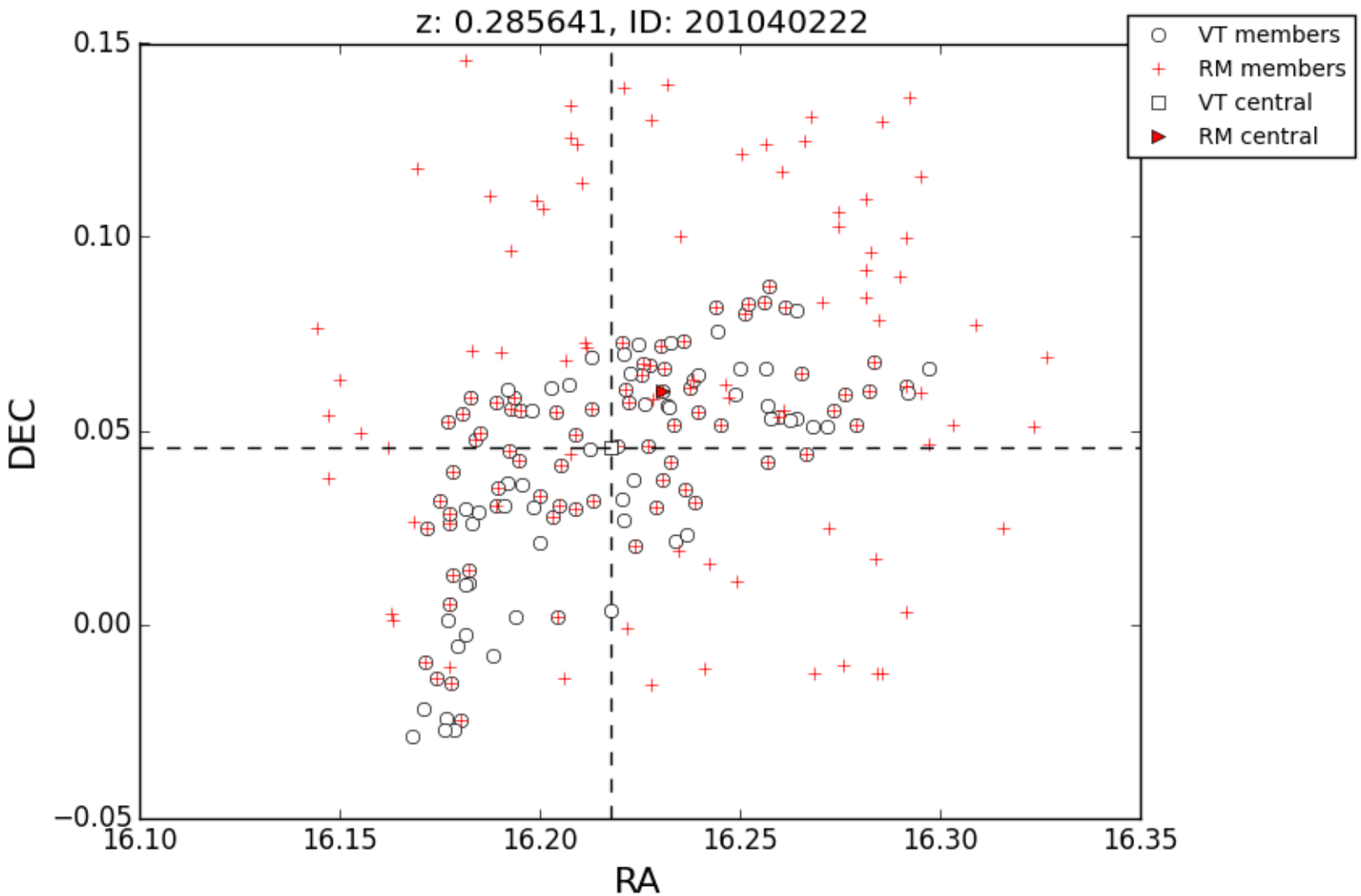


- RM-CS82 clusters: RM richness > 15
- VT-CS82 clusters: VT richness > 15

Preliminary results: matches c-m diagrams

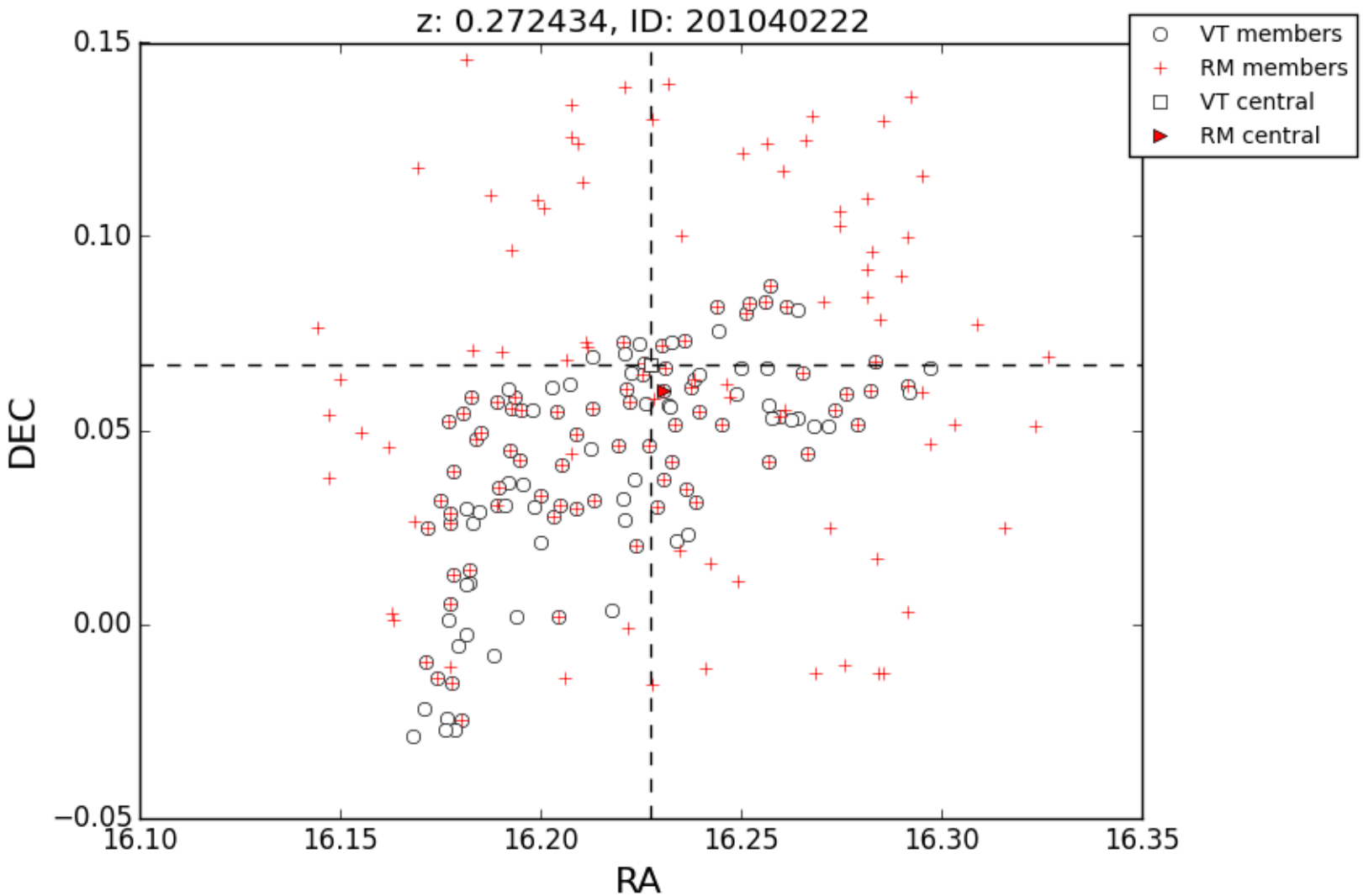


Preliminary results: matches sky distribution



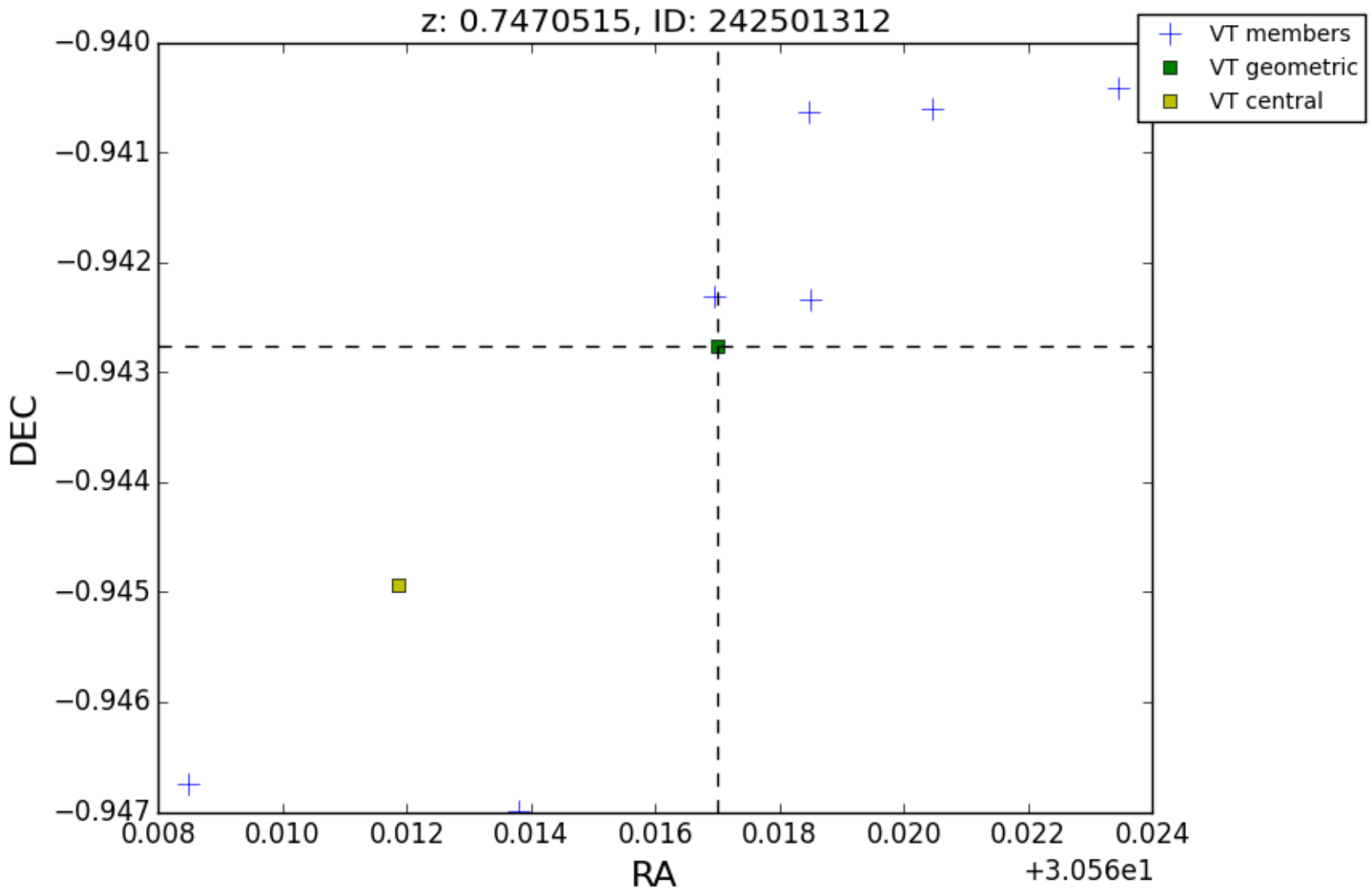
RA, DEC: geometric center

Preliminary results: matches sky distribution

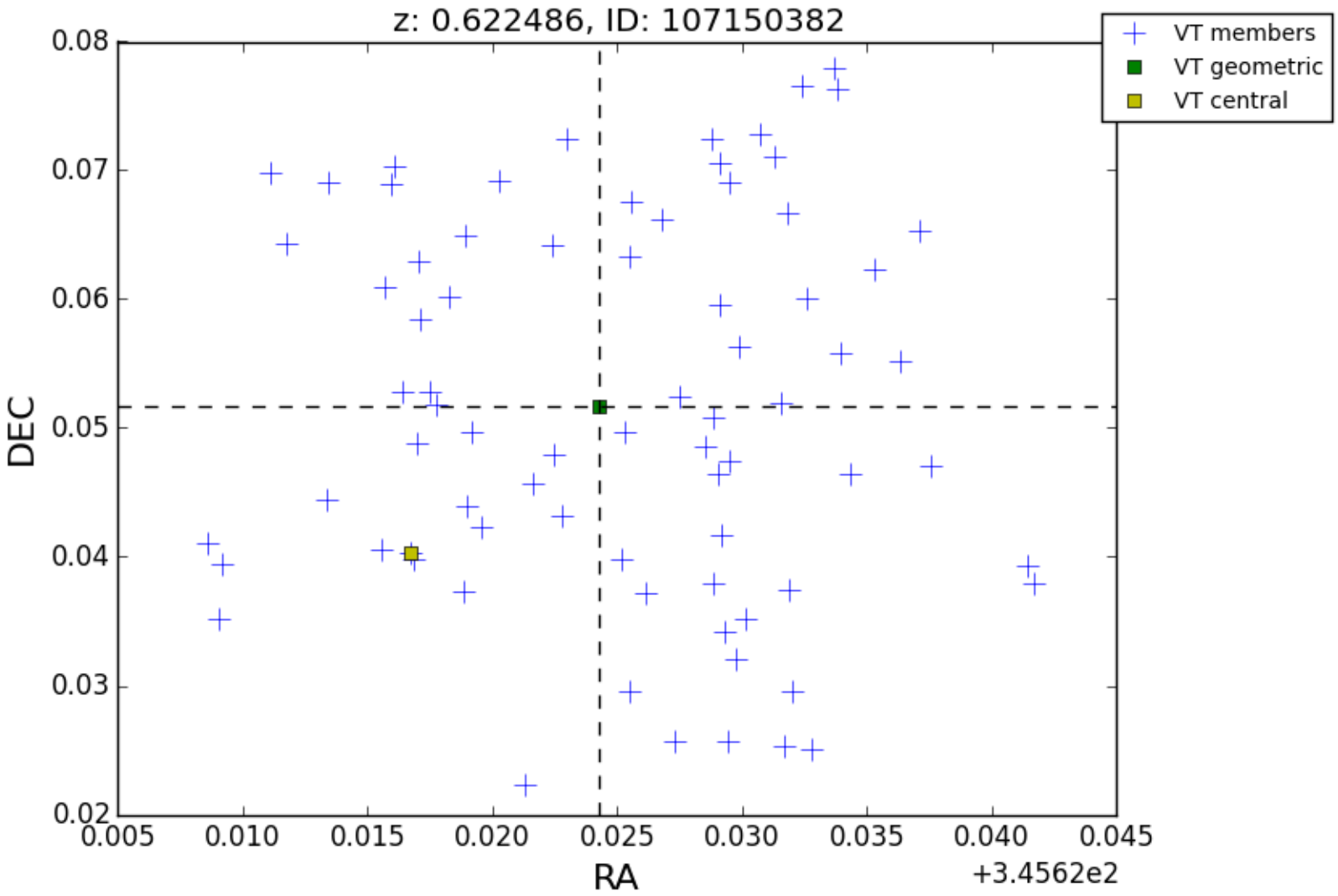


RA, DEC: central galaxy

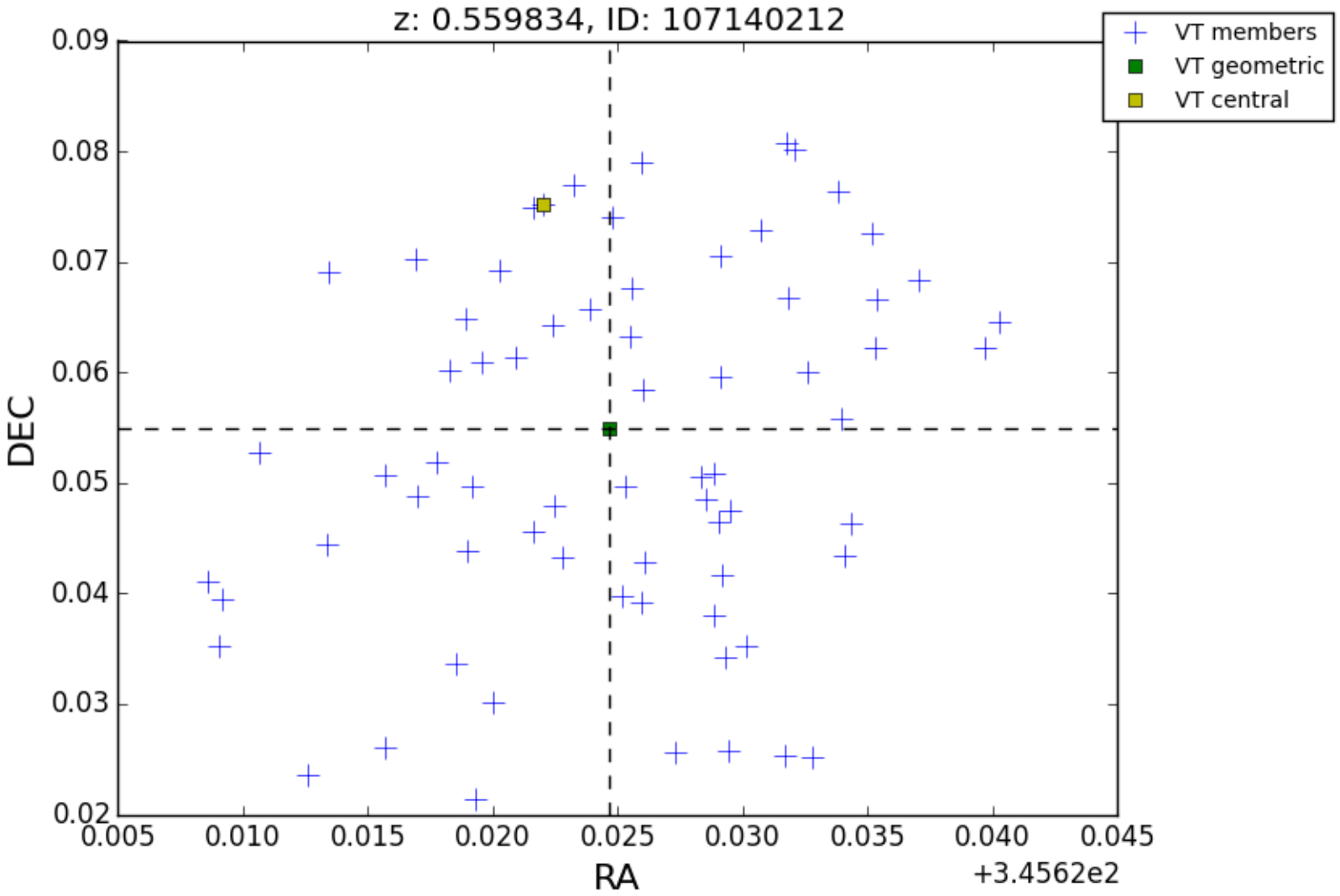
Preliminary results: unmatches sky distribution



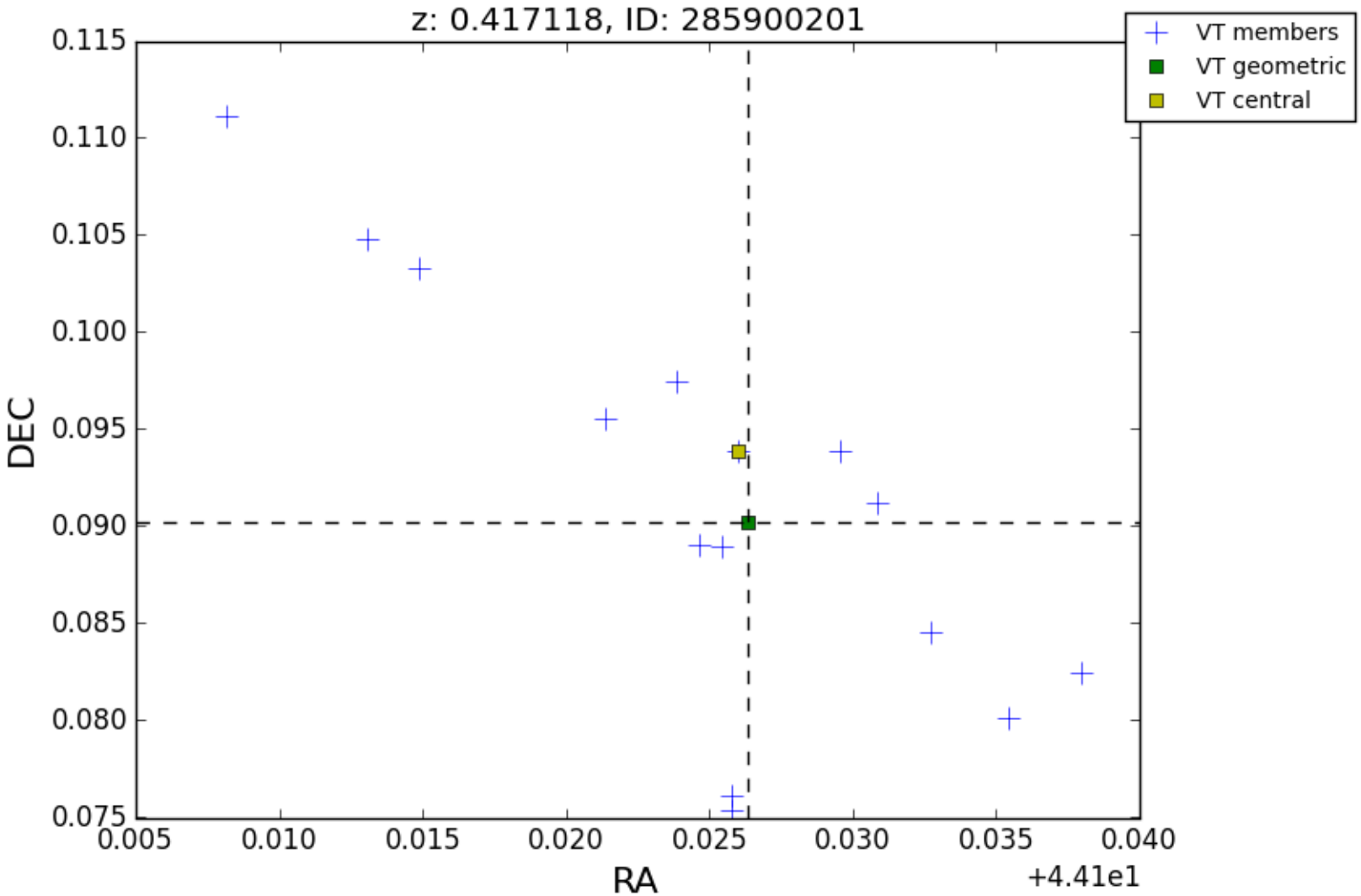
Preliminary results: unmatches sky distribution



Preliminary results: unmatches sky distribution



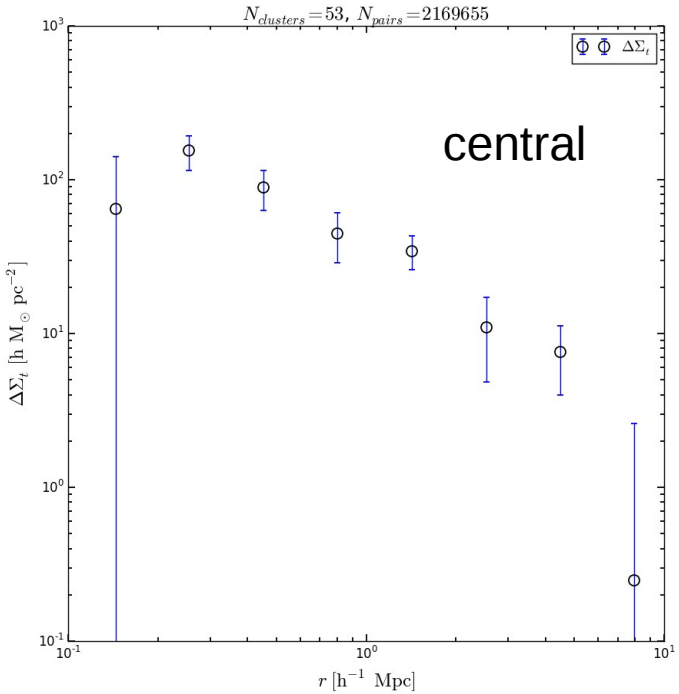
Preliminary results: unmatches sky distribution

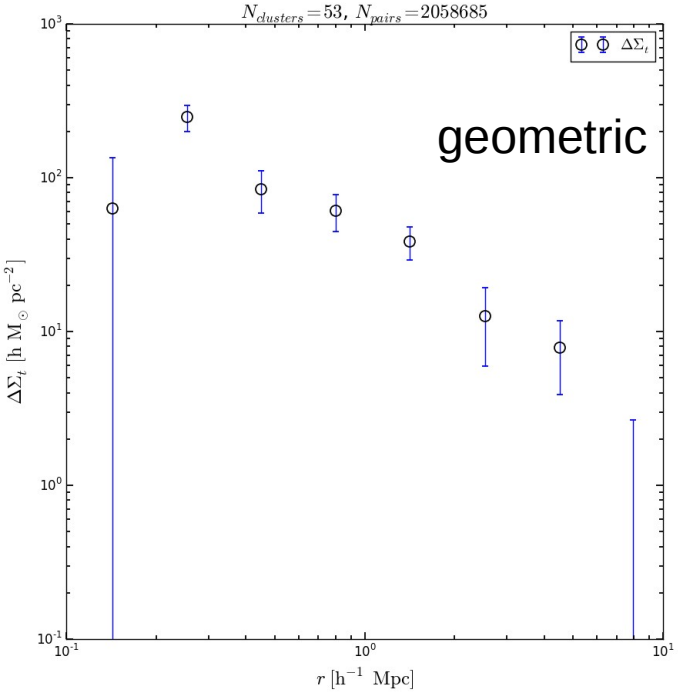


Matching: final samples

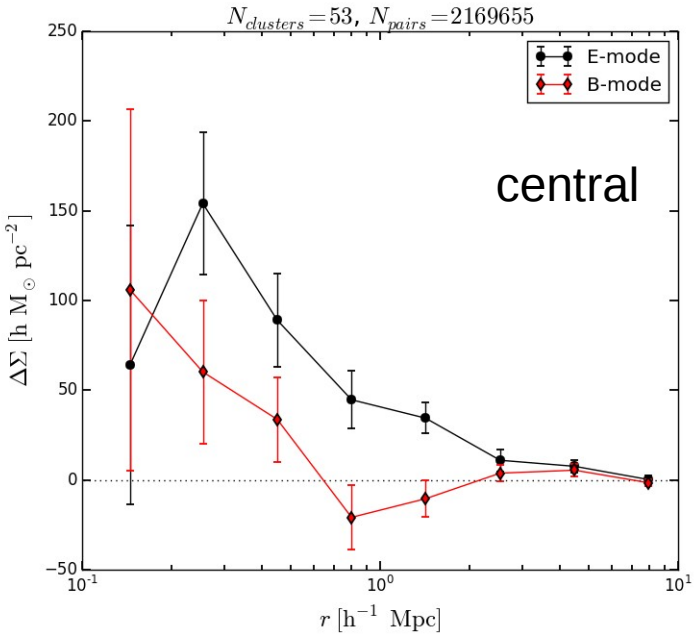
- Matched sample: common clusters from the 58 RM-CS82 and 70 VT-CS82
- **53** clusters → **“matched sample”**
- Using VT-CS82 as reference to analyze if there are clusters not identified by the red-sequence method we have a sample of **30 unmatched clusters**
- WL signal from the unmatched sample?

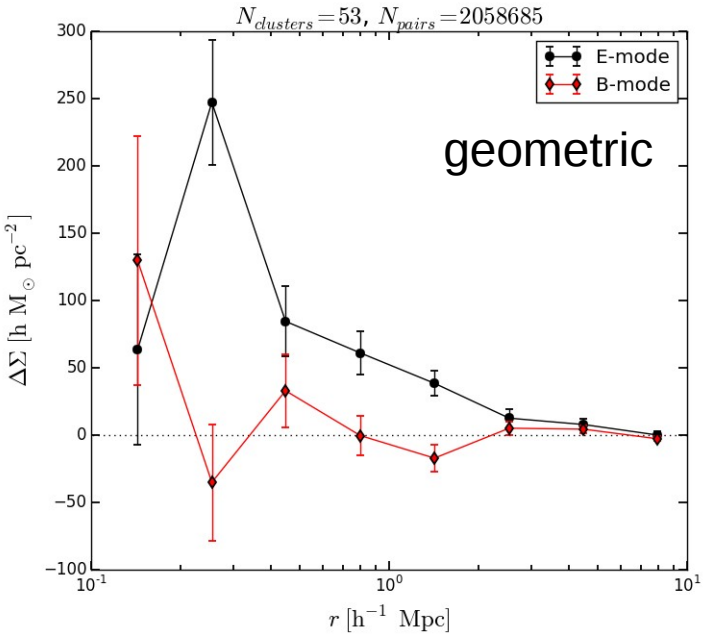
Preliminary results: shear from matched sample



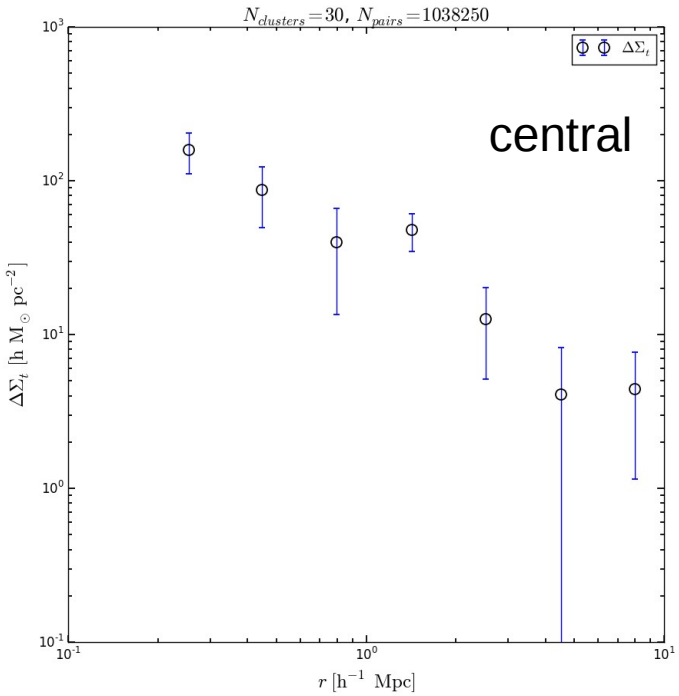


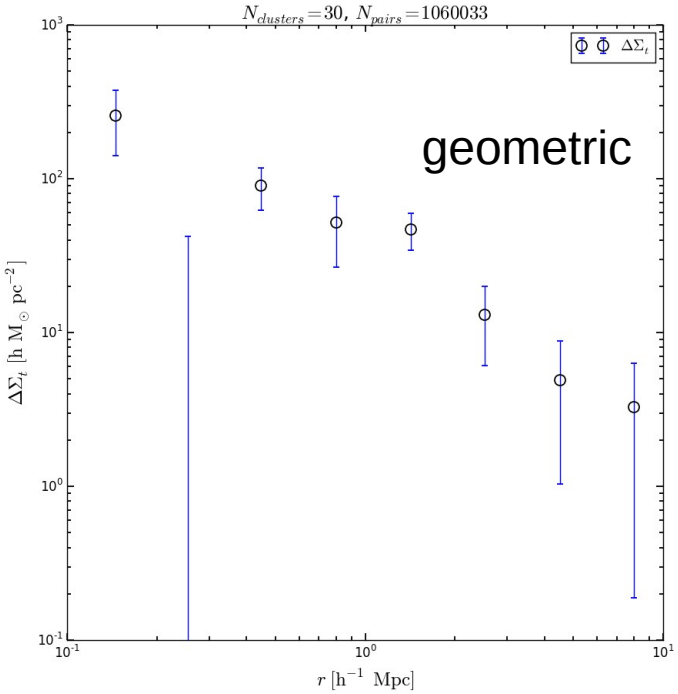
53 clusters



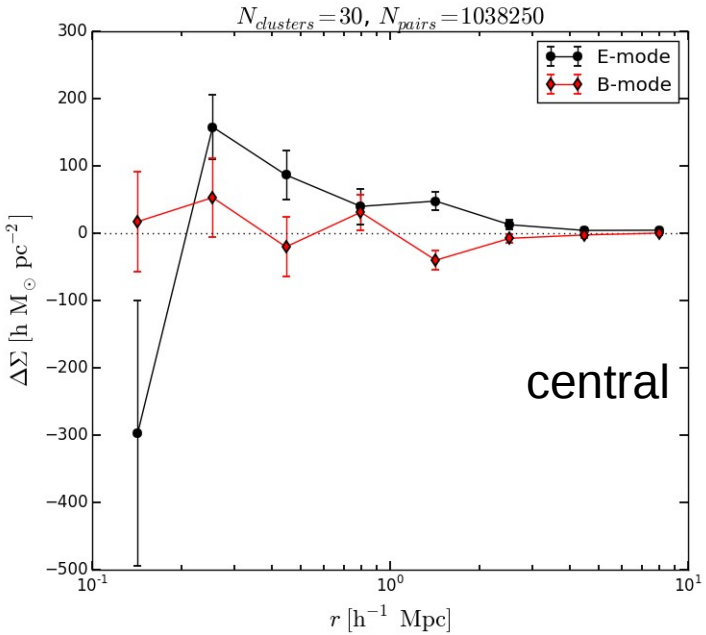


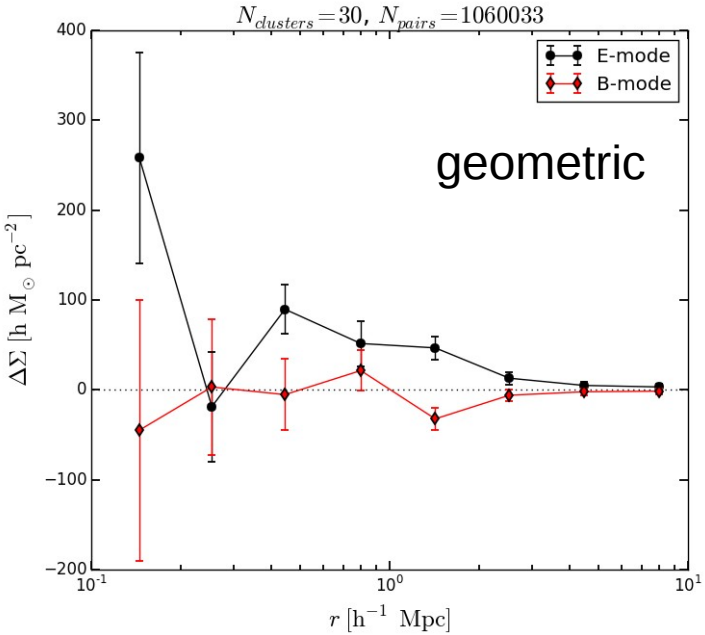
Preliminary results: shear from unmatched sample





30 clusters





Perspectives

- Unmatched clusters have real mass?
- One way to test: random points to check if we recover a signal consistent with zero
- Color-magnitude histograms
- Mis-centering analysis
- Future: if they are real, profile fitting, mass-calibration, etc.