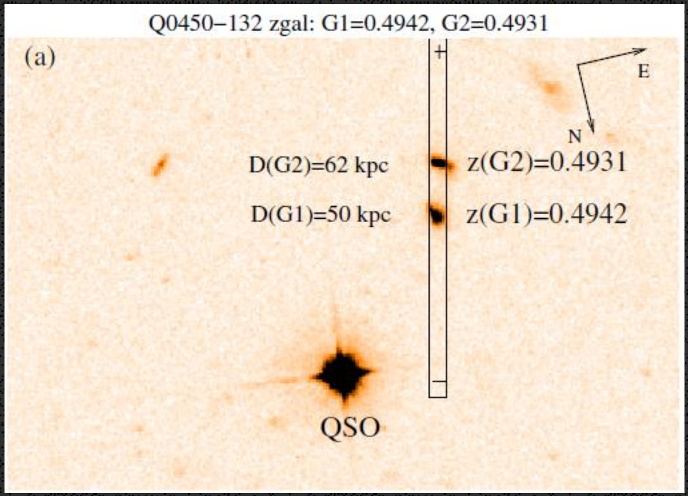

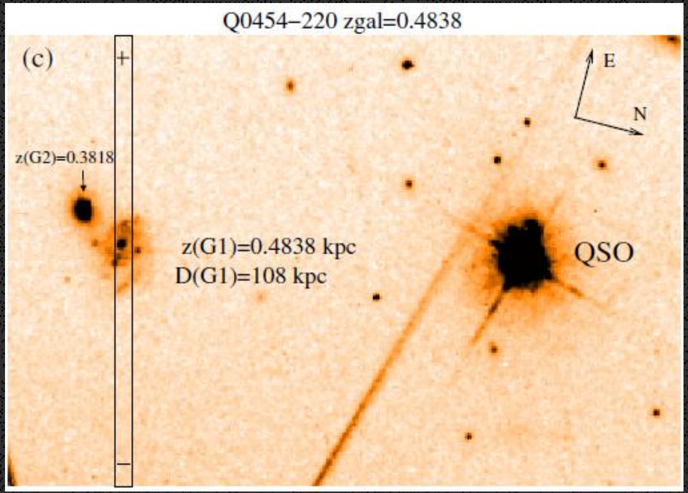

MAGIICAT: GENERAL CHARACTERISTICS OF THE MGII ABSORBING CIRCUMGALACTIC MEDIUM

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Collaborators:

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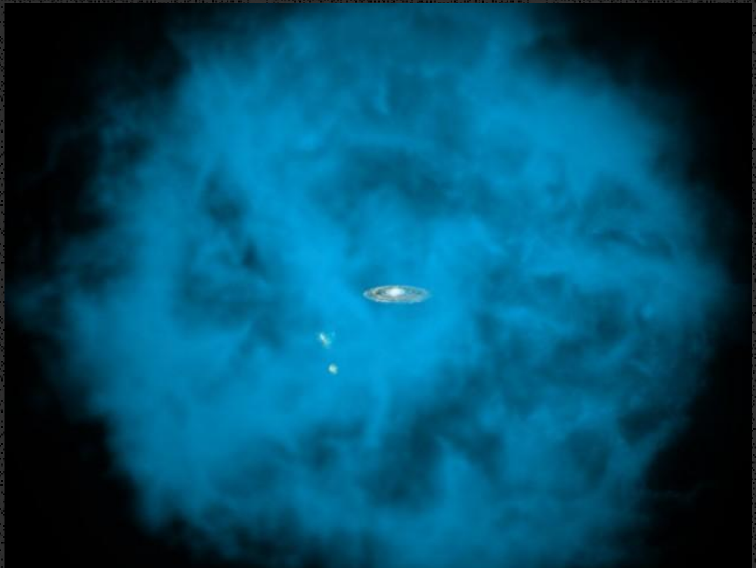
The Circumgalactic Medium

- Reservoir of gas which feeds future star formation
- Material through which winds outflow, filaments accrete, & mergers are tidally stripped
- Harbors a gas mass rivaling that in galaxies

- What are the detailed physical characteristics of the CGM for galaxies of different masses, luminosities, & colors?

- COS-Halos for $z<0.4$, KBSS for $z\sim2.5$
  - Need to fill in this redshift gap!



NASA/CXC/M.Weiss; NASA/CXC/Ohio State/A.Gupta et al.

Quasar Absorption Lines - MgII

- Background QSO probes foreground galaxy through absorption – HI, CIV, OVI, MgII

MgII

- Observed from the ground in the optical with high resolution
- Observe redshift region that COS-Halos and KBSS are not studying
- Cold gas (3.5x10^4 K)
- Traces HI column densities of $16.5 < \log N(\mathrm{HI}) < 21.5+$
- Probes structures such as outflows, inflows

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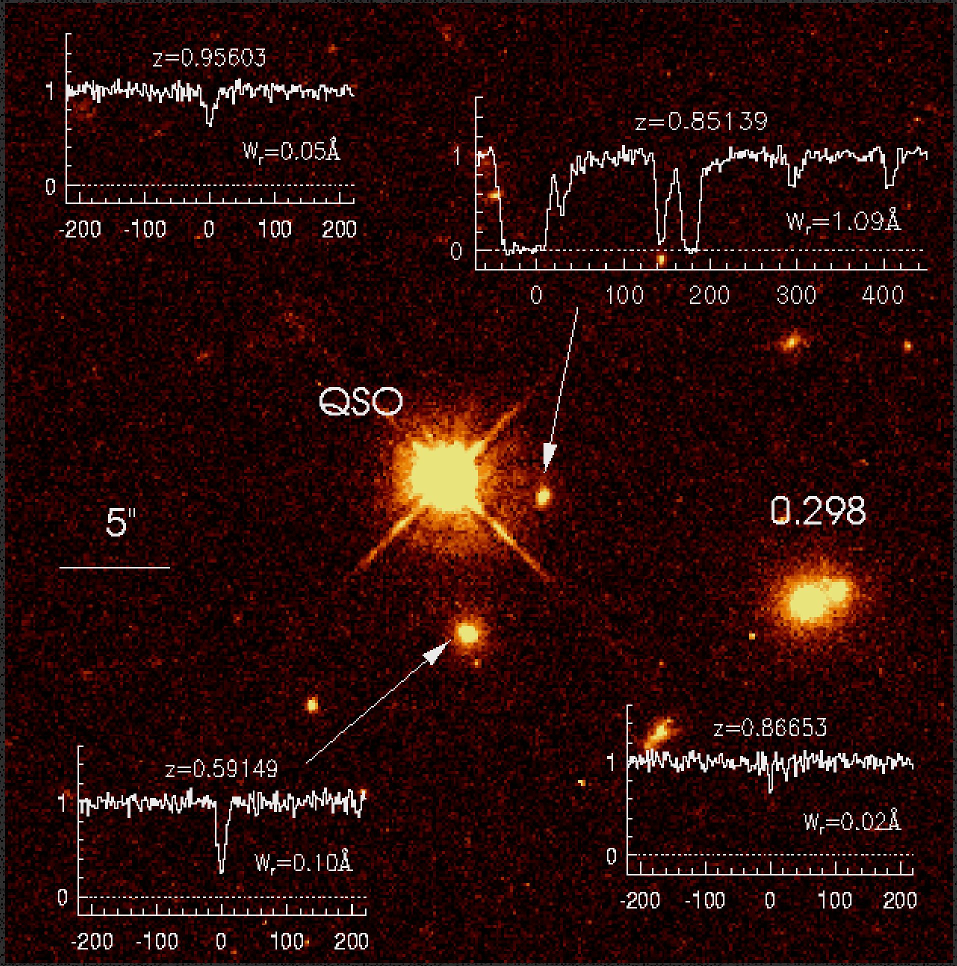
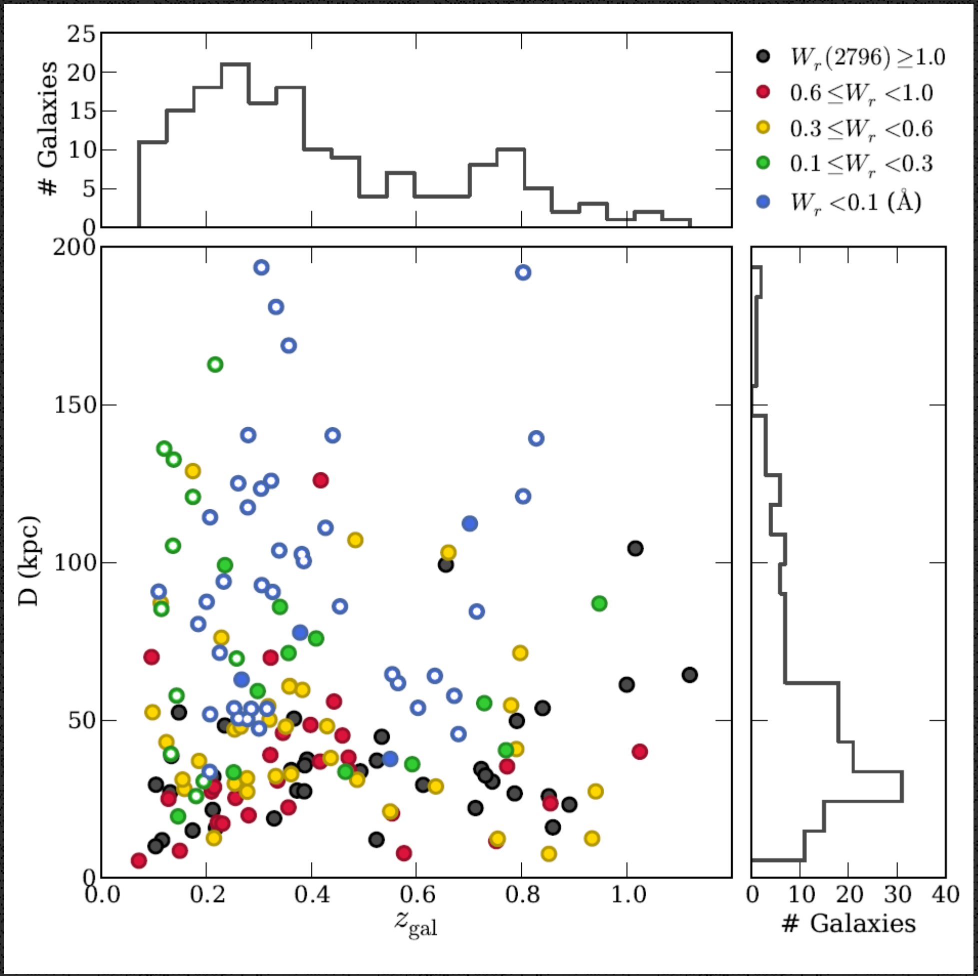


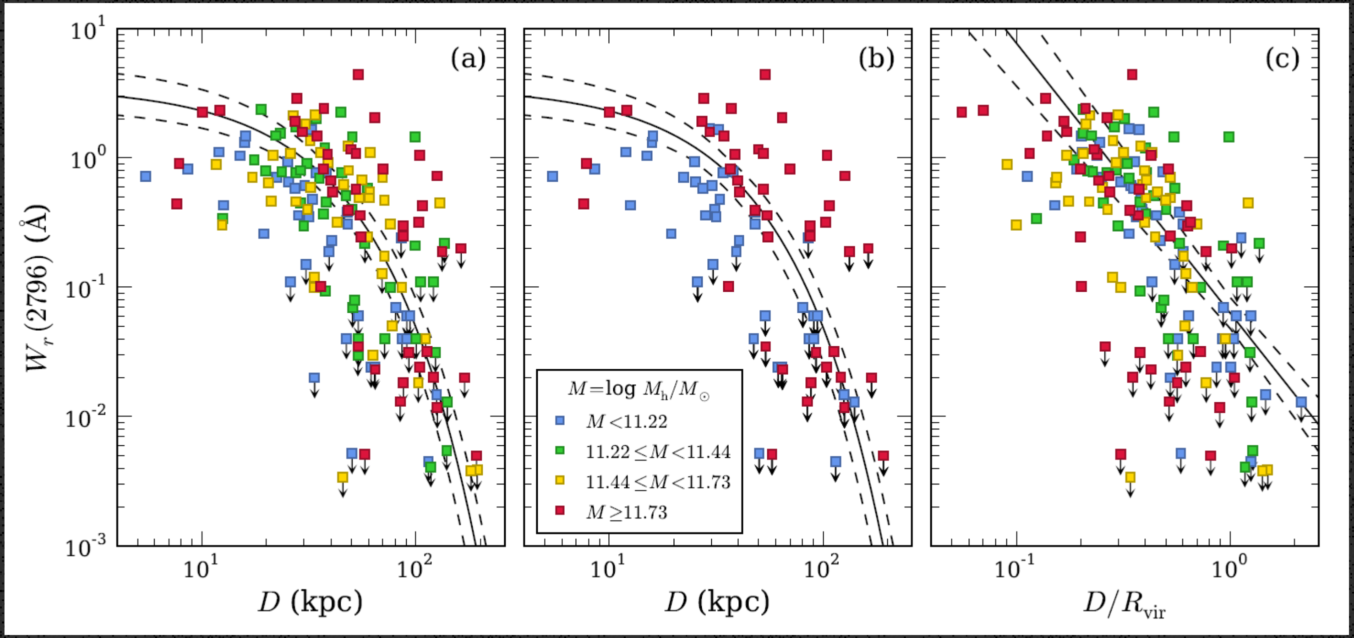
MAGIICAT – MgII Absorbing Galaxy Catalog



- 169 isolated MgII galaxies
- $0.1 < z < 1.1$
- $D < 200$ kpc
- 0.03 Å $< W_r(2796) < 4.4$ Å
  - upper limits down to 0.003 Å
- B- and K-band absolute magnitudes M_B, M_K
- Luminosities L_B/L_B^*, L_K/L_K^*
- B-K colors
- Halo masses (M_h) from halo abundance matching

$W_r(2796)$ vs D

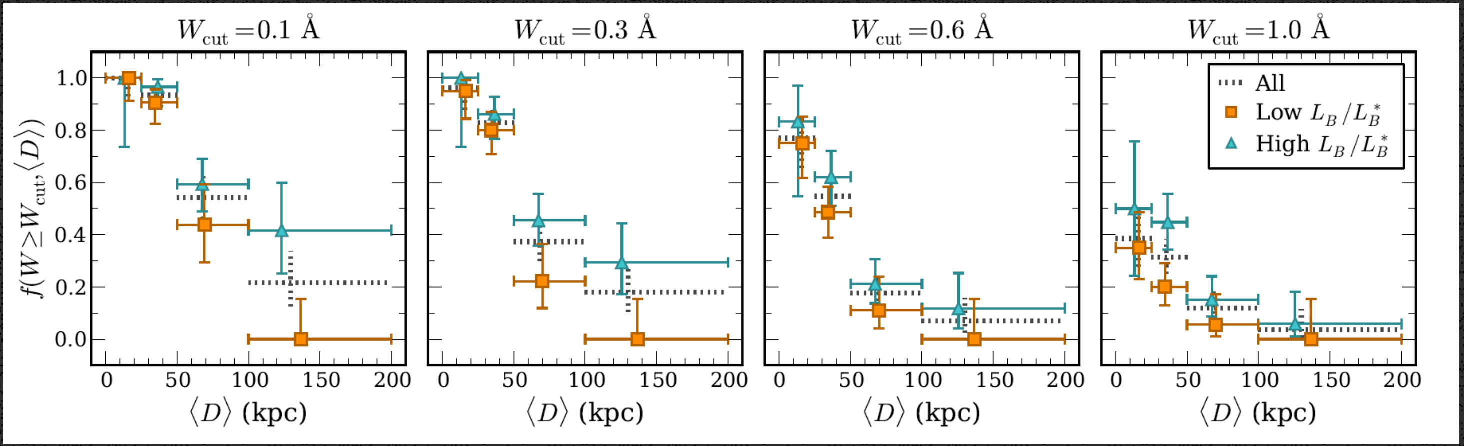
- Anti-correlation between $W_r(2796)$ and D – 8.2 σ
- Highest mass galaxies have larger EW at a given D
- Mass segregation vanishes when normalizing by virial radius – 9.2 σ anti-correlation

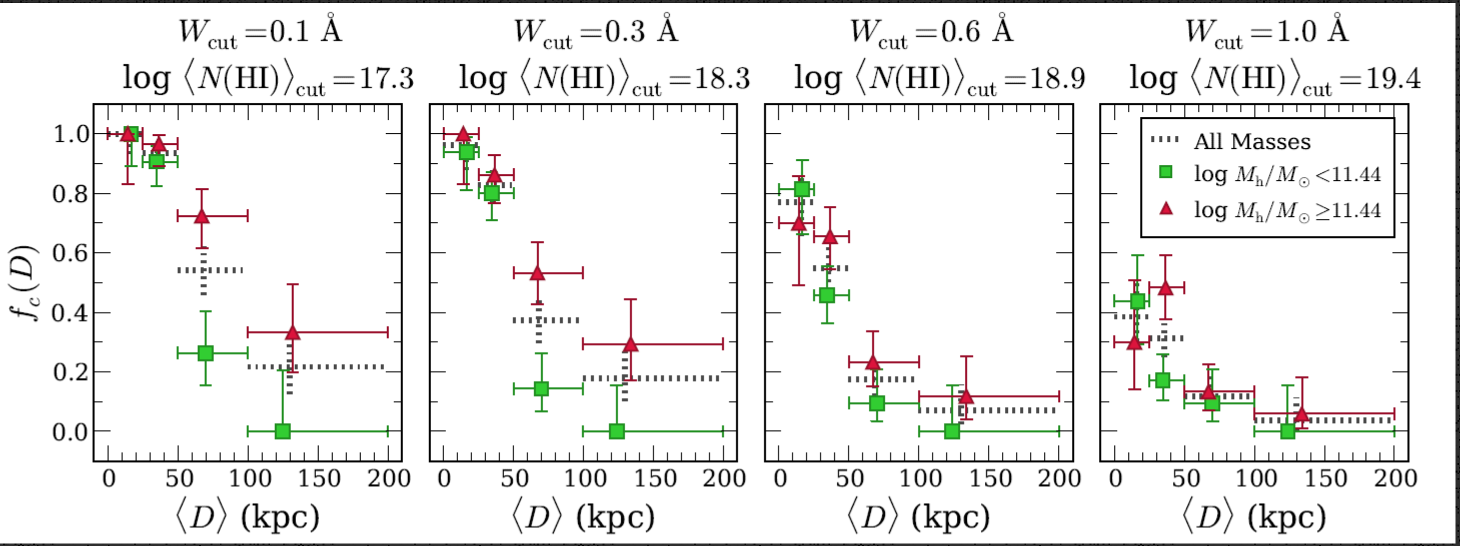


- Amount and extent of MgII gas depends strongly on mass arXiv:1211.1008, arXiv:1211.1380

Covering Fractions

- Patchiness of the CGM depends on luminosity and mass





Nielsen et al. 2013, in prep.

Two-Point Velocity Correlation Function

- Work conducted at Swinburne University of Technology in Australia through NSF EAPSI – 8 week summer program

- MgII cloud velocity probability distribution function
- Probability of finding any two clouds separated by Δv

Absorption line Voigt profile fits by Dr. Jessica Evans (NMSU)

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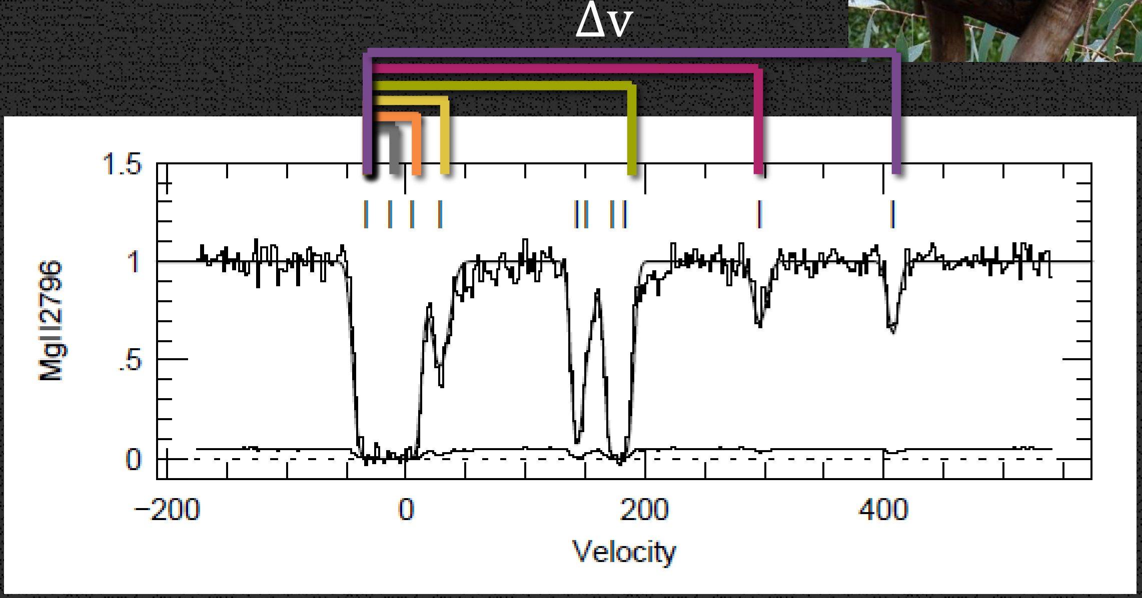
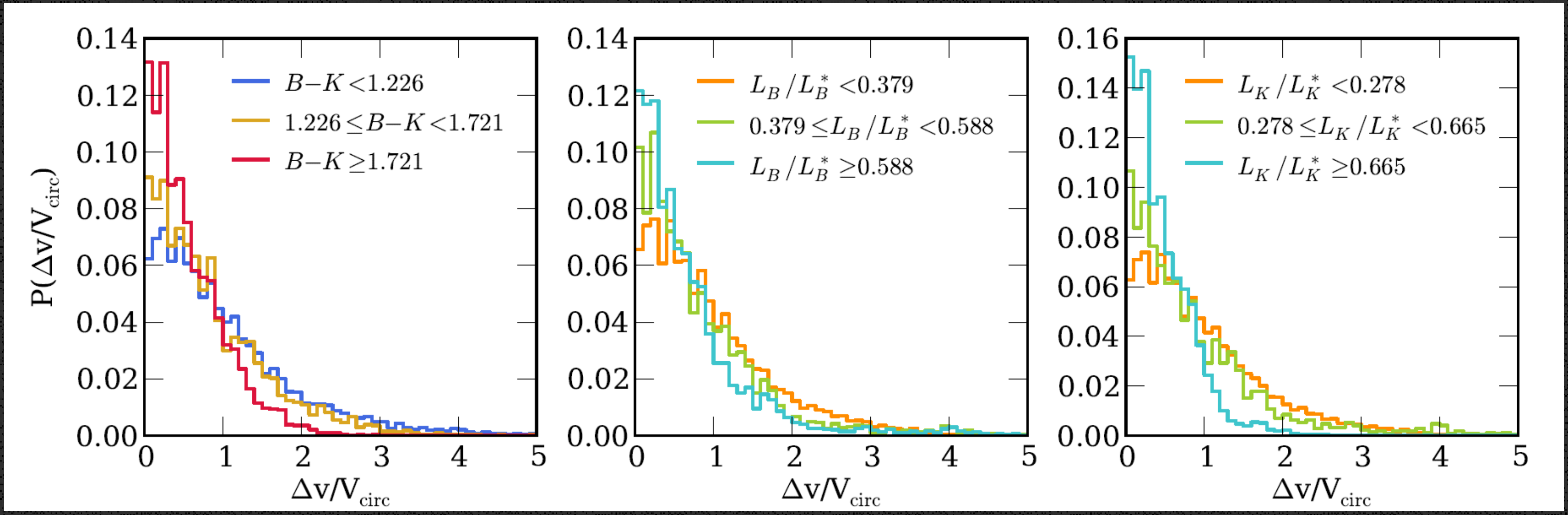


Two-Point Velocity Correlation Function

- 3 equal number subsamples, cut by color and luminosity



- More chaotic processes likely found in the CGM of blue and low luminosity galaxies – galactic winds/outflows?

Conclusions

- Studying the CGM is crucial to understanding galaxy evolution
- MAGIICAT – Largest sample of MgII galaxies
- The properties of the CGM strongly depend on the host galaxy color, luminosity, and halo mass