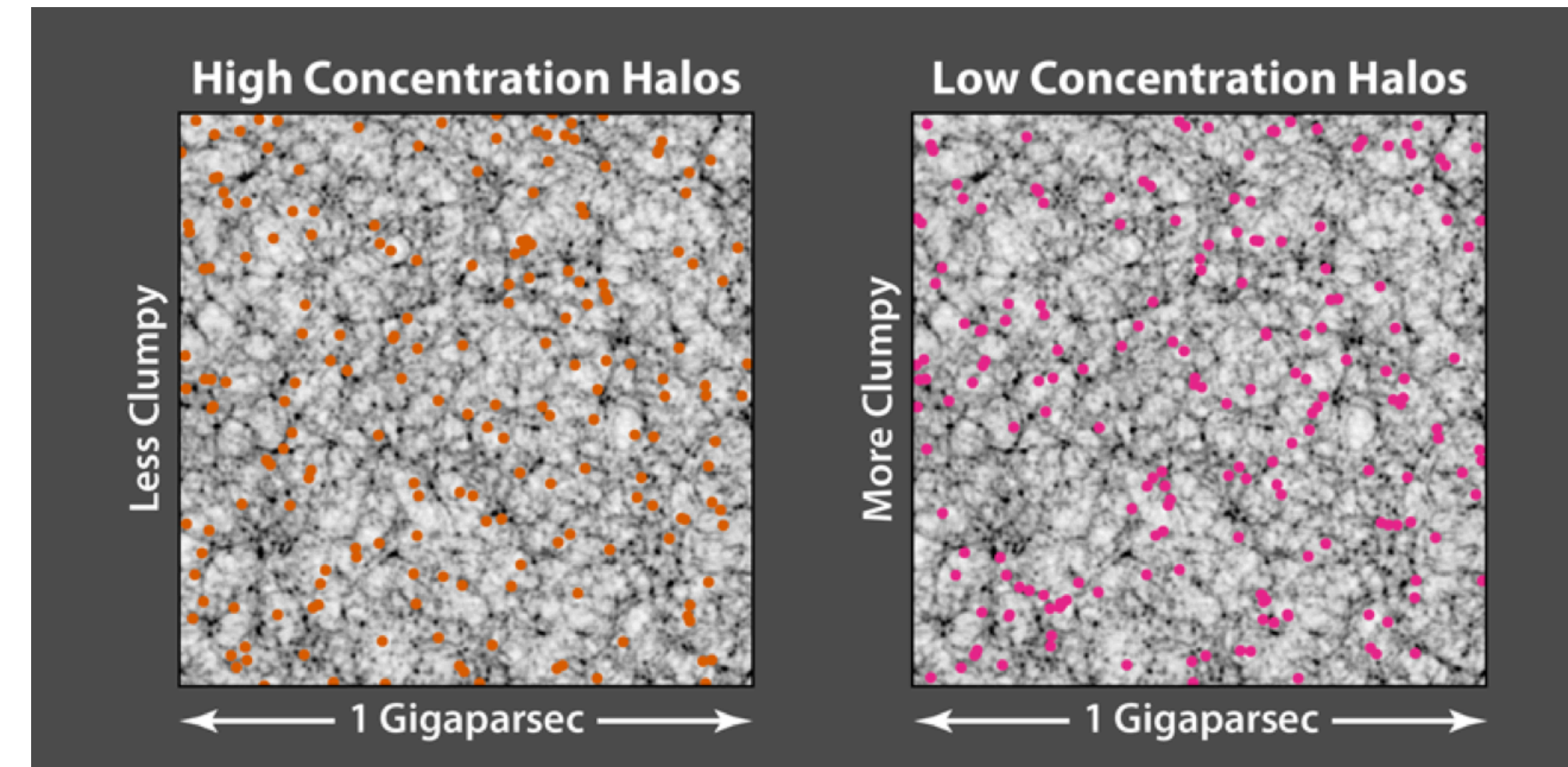# Study of assembly bias and splashback radius through multi-wavelength data set and weak lensing

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Assembly Bias and Splashback Radius

- Assembly bias

  - Clustering of dark matter halos that depends on halo properties other than mass.

  - Assembly bias of galaxy clusters is a relic of primordial fluctuations according to ΛCDM.

 - Assembly bias is not observational detected yet.

- Splashback radius

  - First apocenters of infalling particles into a dark matter halo.

  - Physical boundary of galaxy clusters.

- Assembly bias and splashback radius are related through mass accretion history of dark matter halo.

Simulation by Frada et al. (2012), visualized by S. More
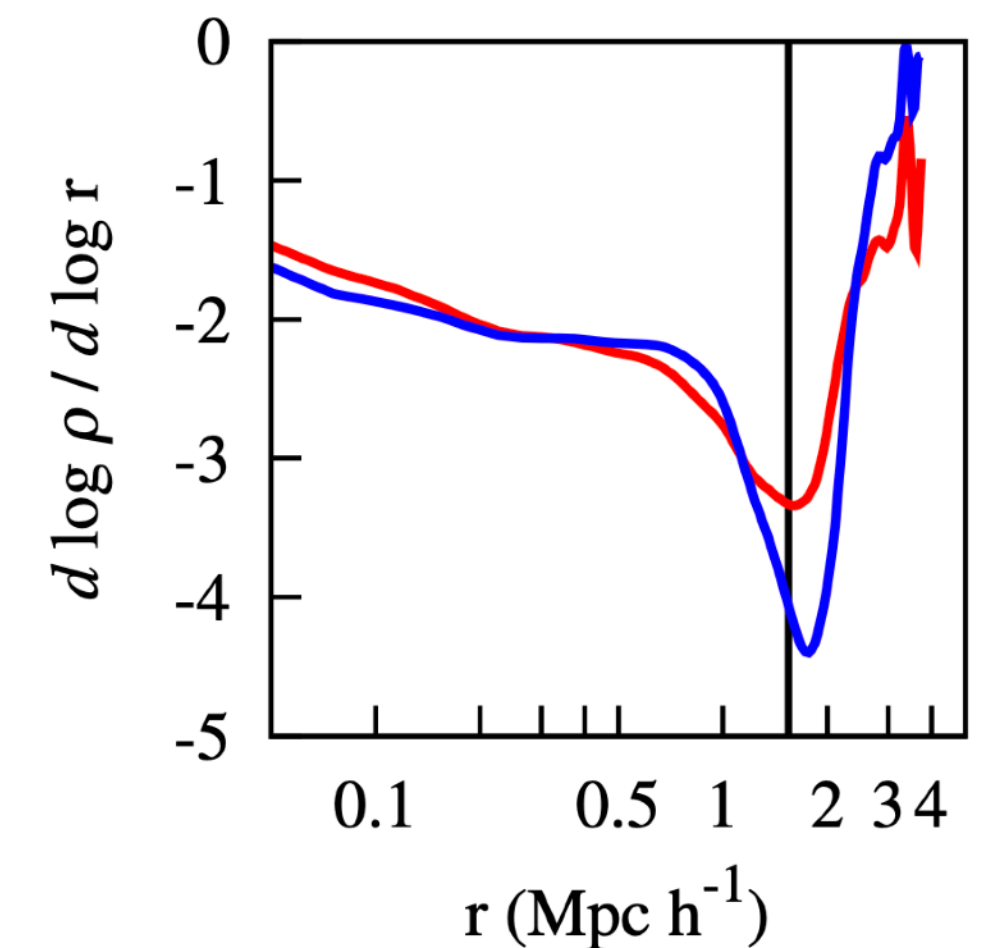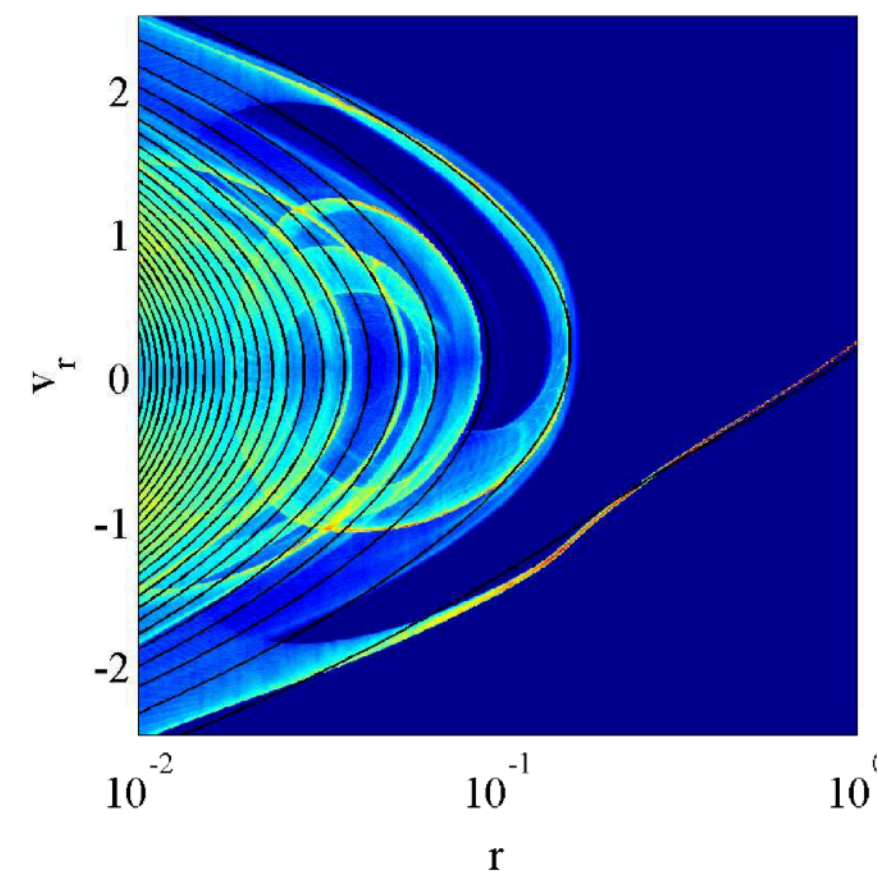
Adhikari, Dalal, & Chamberlain (2014)

Observational Study of Assembly Bias

- Define subsample of SDSS clusters
  (Yang et al., 2007) using halo formation
  history in the constrained simulation
  Elucid.

- Cluster mass is measured by weak
  lensing with SDSS sources.

- Taking into the difference of cluster
  mass, the difference of clustering at
  large scale is ~3σ!
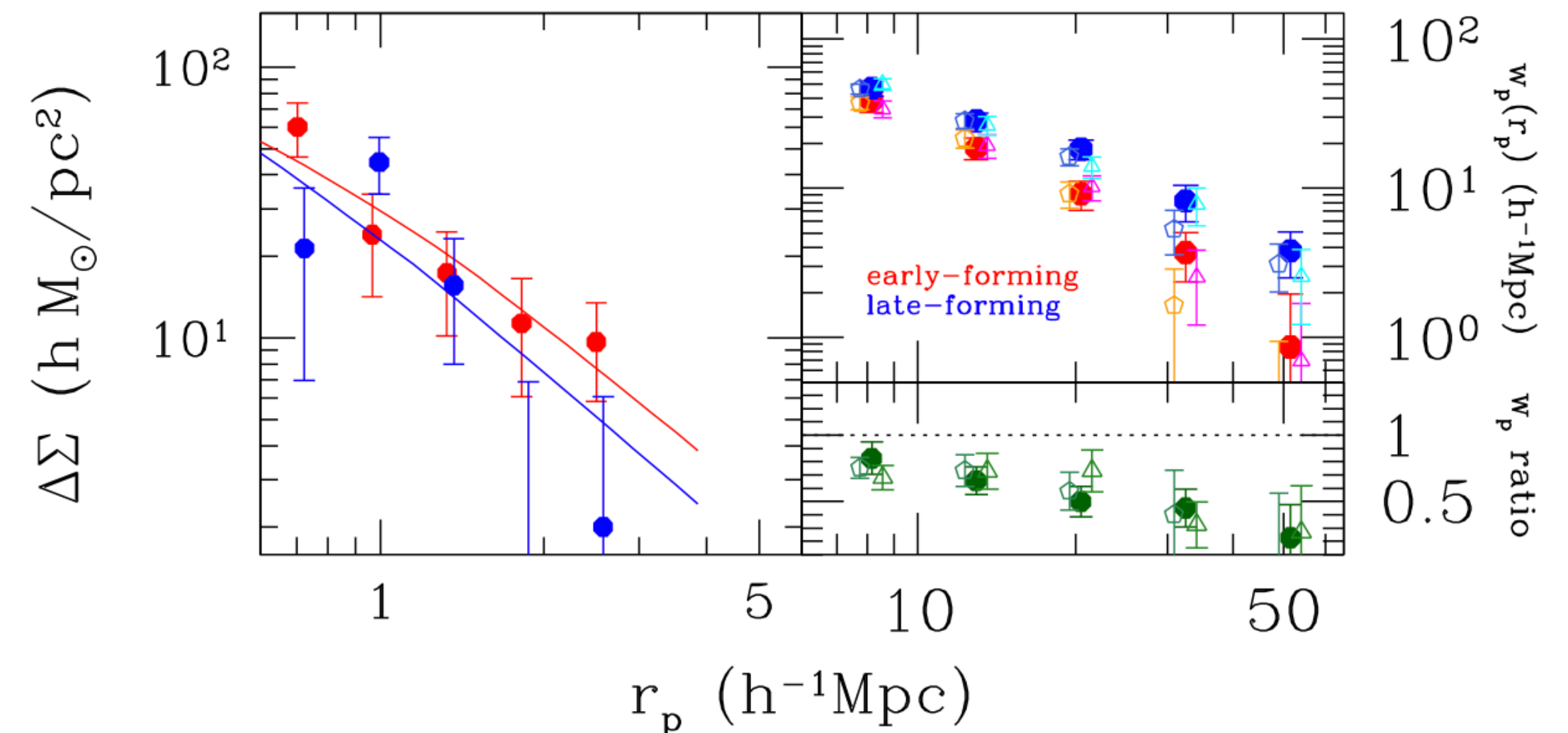
Lin, **HM**, Guo, et al. (A&A, 2022)

Splashback Radius Measurement

- X-ray clusters are selected using eROSITA eFEDS data.

- Cluster mass is measured by weak lensing with HSC sources.

- Splashback radius is measured by cross-correlating the clusters with HSC galaxies.

- Measured splashback radius consistent with ΛCDM prediction.

Rana, More, **HM**, et al. (A&A, 2022)