Galaxy Quenching in Cluster Outskirts

Oh, and Filamentary Accretion into the ICM.

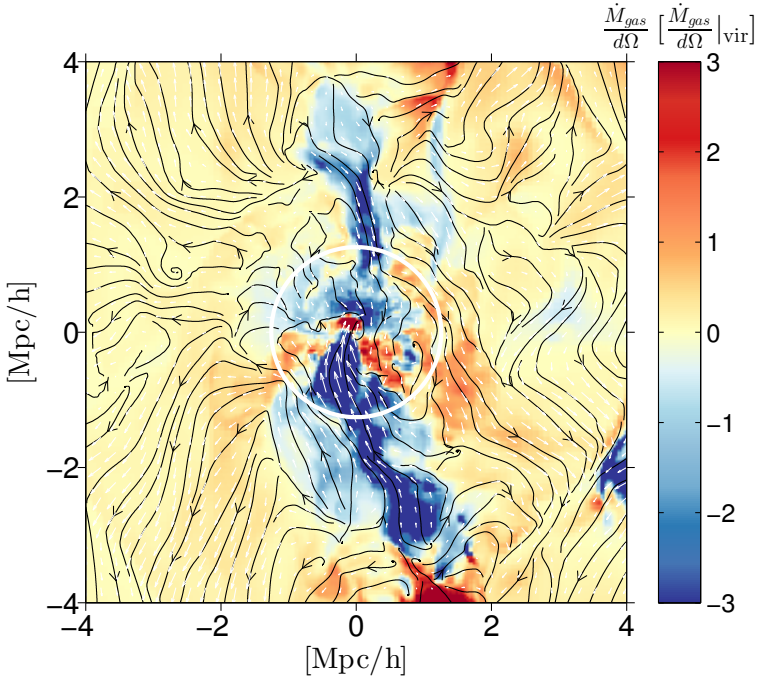
Elad Zinger

MPIA

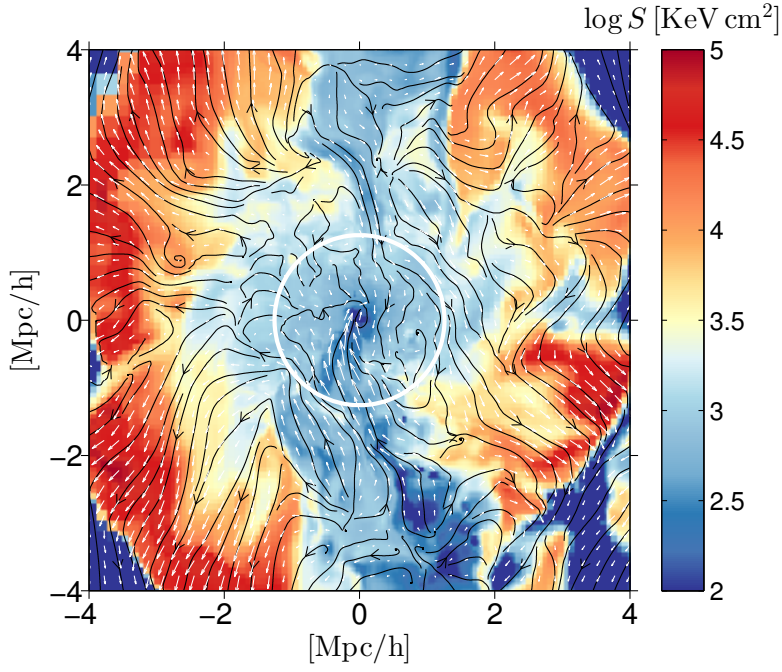
December 12, 2017

Important Things about the ICM

- The accretion shock around clusters extends to 2-3 times $R_{\rm vir}$.



Mass Inflow rate



Entropy

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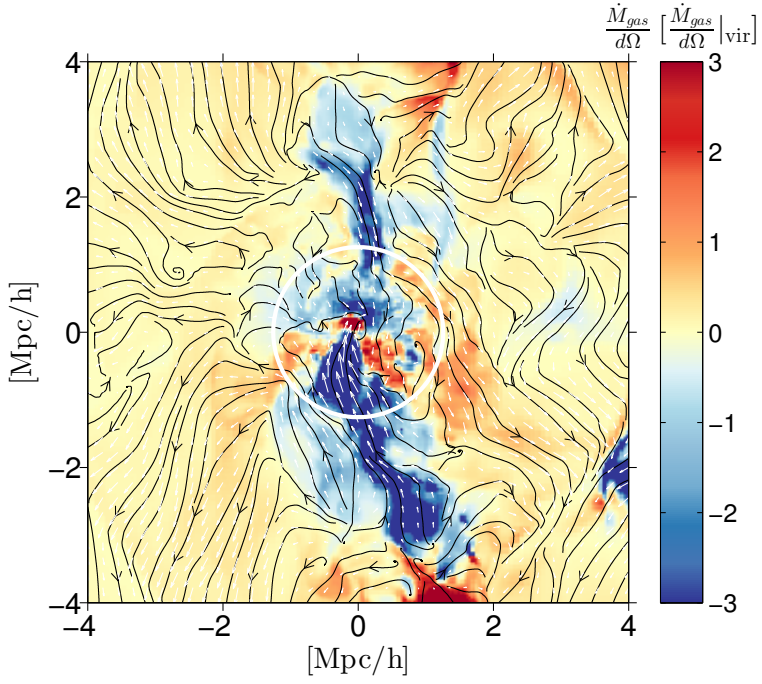

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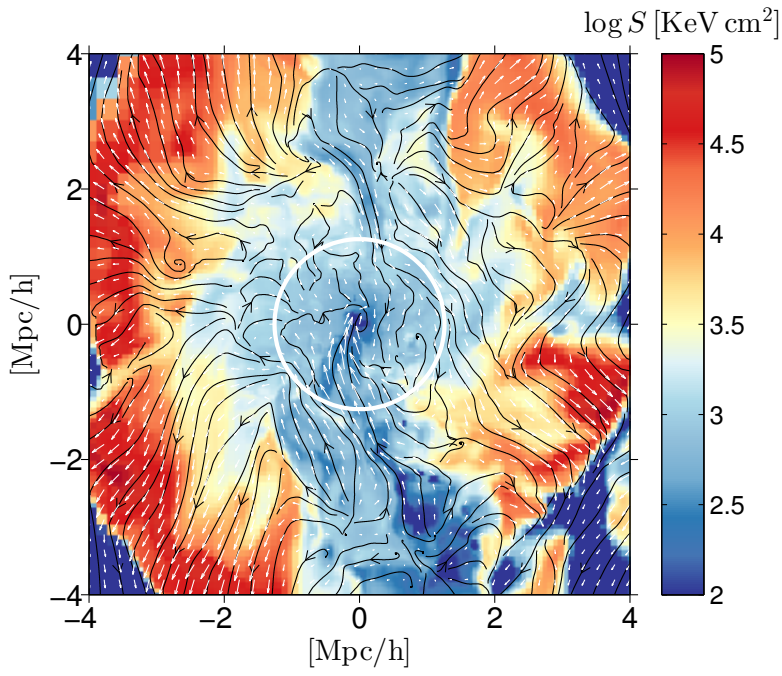

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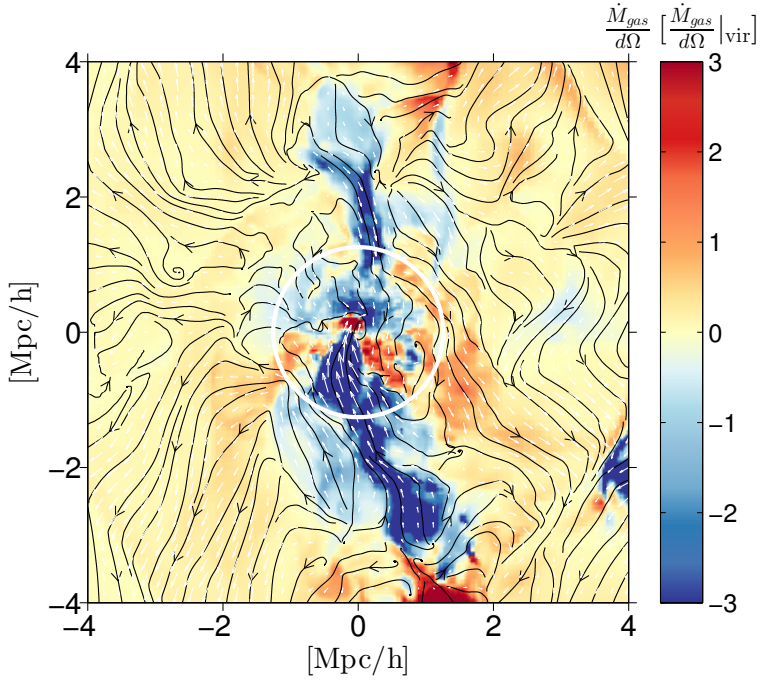
  - Which originate in filaments of Cosmic Web
  - Which pre-heat the gas to $\sim 10^6\,{\rm K}$
  - Which can sometimes penetrate to the inner regions of the cluster (and sometimes not...)



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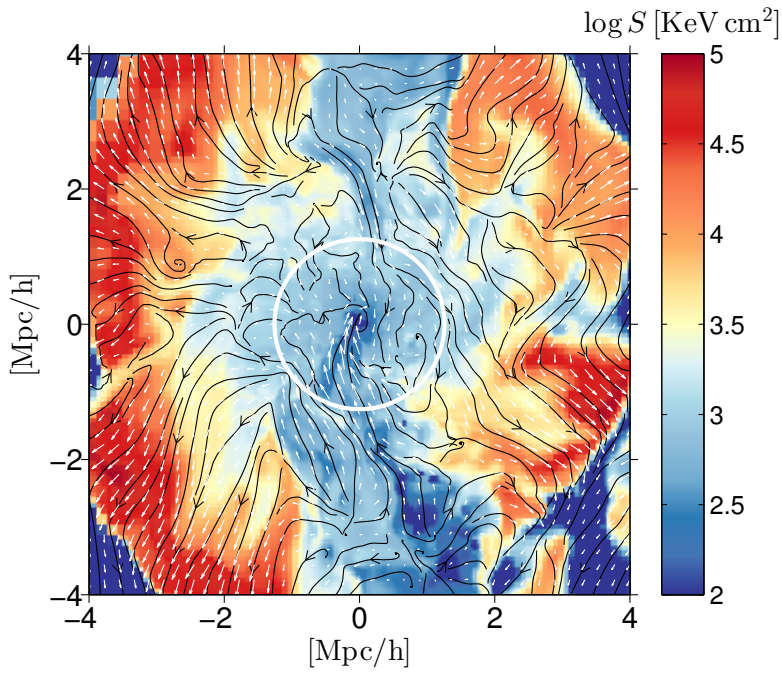

Entropy

RPS: Analytic Models in Cosmological Simulations

To answer the question:

1. We used analytic models of the satellite galaxies and their gas halos for which the gravitational binding force can be computed.

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3. Use the fudge factor to play with effectiveness of RPS - use the simple model in the very strong and very weak limits.

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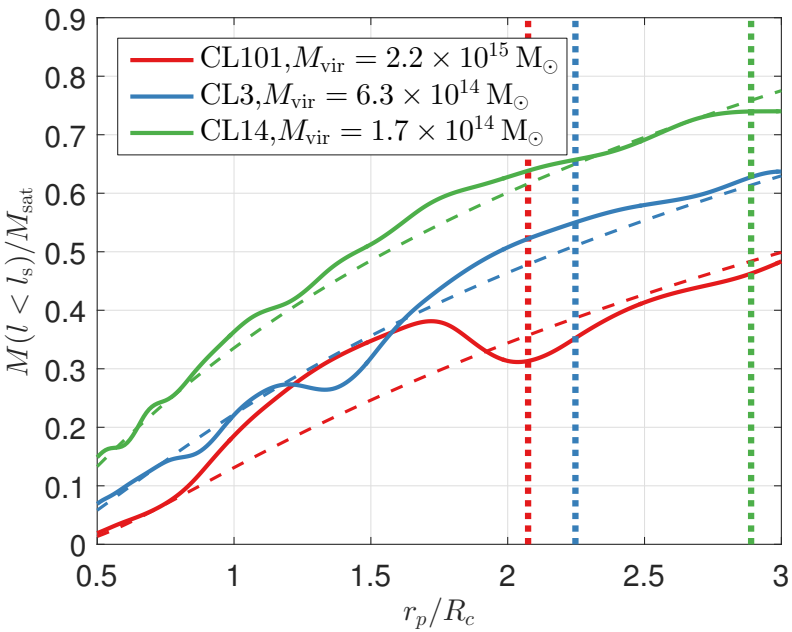
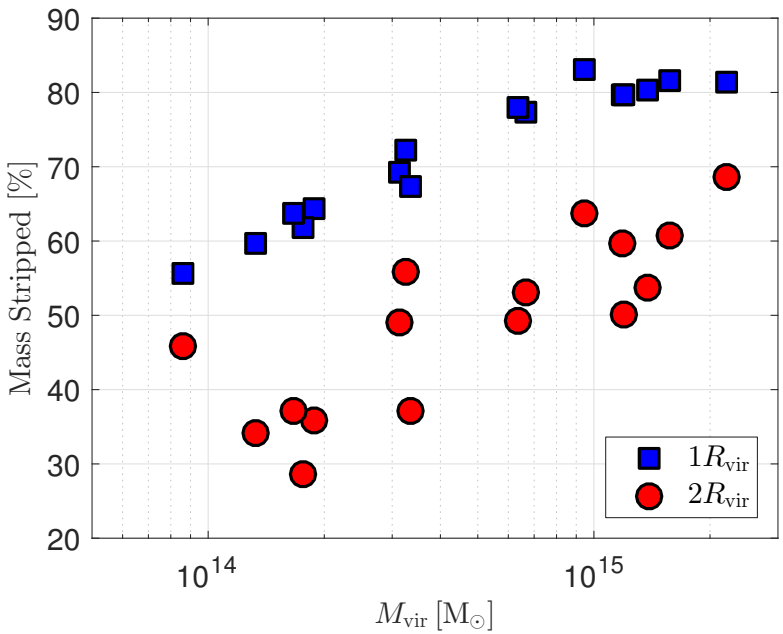
Stripping the Gas Halo

- Spherical gas halos follow an NFW Model.
- Gas removal was found to be effective with $\sim 50\%$ of the gas removed at the accretion shock and $80\% - 90\%$ of the gas removed at $R_{\rm vir}$ in clusters of $10^{14}\,\mathrm{M}_\odot$ and above.
- Results hold even when fudge factor was turned way down...

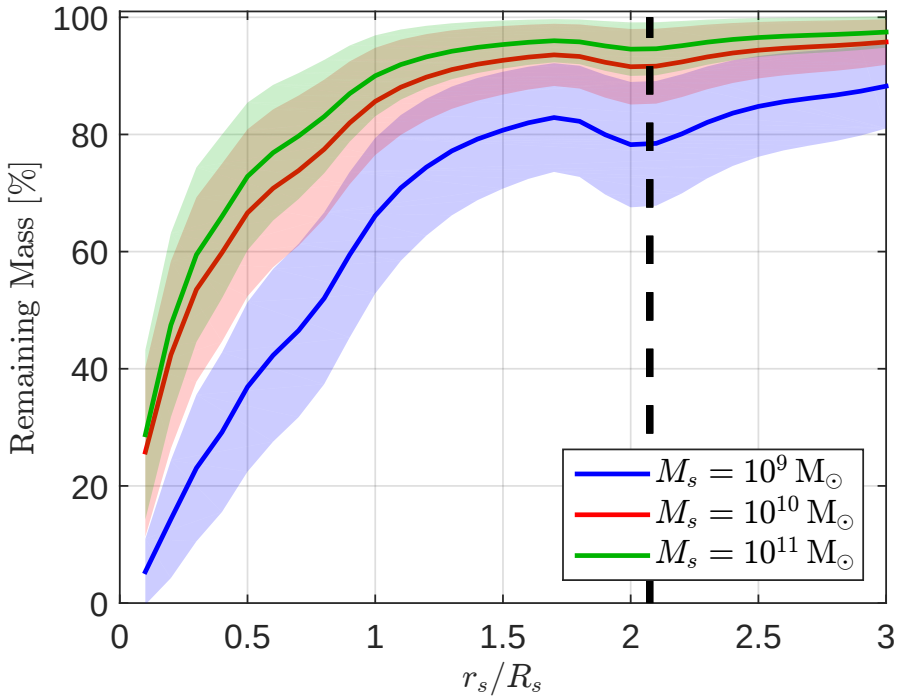


RPS for a $M_{\rm vir} = 10^{11}$ Satellite



Stripping ISM from Galaxies

- Galaxies modelled as exponential disks of stars and gas, with stellar bulges in an NFW DM halo
- Large parameter space overcome by generating large catalogs.
- RPS effective only in cluster centers $\lesssim 0.2 R_{\rm vir}$, even in the most favorable conditions.
- Non-linear relation between gas removal and SF quenching (70% gas removal for 50% Sf reduction)



RPS of disk in $2 \times 10^{15}\ M_\odot$ Cluster

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Learn more at : arXiv:1610.02644 (or come talk to me!)