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# The Fate of Infalling Galaxy Groups: Insights from The300 project

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## Résumé

Clusters grow by accreting galaxies from the cosmic web. To understand the evolution of cluster galaxies, it is crucial to disentangle their past environmental histories from the final stages of their interaction with a rich intracluster medium. Some galaxies fall in directly from the field after a long period of secular evolution. Others are funnelled along filaments, or enter as members of a previously bound group. In this talk, I focus on the dynamics and structure of galaxy groups as they interact with large clusters. The group environment may contribute to pre-processing of galaxy properties prior to cluster accretion by stripping gas or enhancing merger rates, and these evolutionary processes can be enhanced even further when a group enters a cluster. Using a suite of 324 zoom-in hydrodynamical resimulations of massive clusters from TheThreeHundred project, we analyse 1,340 infalling groups (Haggar et al. 2023). We find that most groups do not survive cluster infall-half of their galaxies become unbound by first pericentre. Slow-moving galaxies near the group centres are particularly prone to tidal disruption or mergers. Moreover, the vast majority of groups entering a cluster are doing so for the first time. Our findings have significant implications for observational studies, where a single snapshot cannot easily reveal past orbital history. However, we suggest that groups observed just outside a cluster are unlikely to have previously experienced a cluster environment.

**Mots-Clés:** cluster assembly, simulations, groups, galaxy evolution

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