Conference Poster

Substructures in cold dark matter halos

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Abstract  We analyse the properties of substructures within dark matter halos (subhalos) using a set of high-resolution numerical simulations of the formation of structure in a Lambda--CDM Universe. Our simulation set includes 11 high-resolution simulations of massive clusters as well as a region of mean density, allowing us to study the spatial and mass distribution of substructures down to a mass resolution limit of $10^9$ solar masses/h.

We also investigate how the properties of substructures vary as a function of the mass of the `parent' halo in which they are located. We find that the substructure mass function depends at most weakly on the mass of the parent halo and is well described by a power-law. The radial number density profiles of substructures are steeper in low mass halos than in high mass halos. More massive substructures tend to avoid the centres of halos and are preferentially located in the external regions of their parent halos. We also study the mass accretion and merging histories of substructures, which we find to be largely independent of environment. We find that a significant fraction of the substructures residing in clusters at the present day were accreted at redshifts $z < 1$. This implies that a significant fraction of present-day `passive' cluster galaxies should have been still outside the cluster progenitor and more active at $z \sim 1$. 