
Revealing the quenching history of cluster galaxies using Phase-space Analysis

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Abstract

Using the latest cosmological hydrodynamic N-body simulations of groups and clusters, we study how location in projected phase-space coordinates can provide information about time since first infall of cluster galaxies. We confirm the predictive power of projected phase-space and provide the statistics about time since infall as a function of projected phase-space location. Furthermore, we combine the simulated results with SDSS group catalogs and measure the SF quenching history of SDSS galaxies by assigning time since infall to SDSS galaxies, using our novel way. Our results autonomously confirm the previous quenching model, "delayed-then-rapid" and similar trend of quenching time scale on halo mass and satellite mass with previous results. In addition, by dividing the quenching time scale into separate terms, we find that the delayed quenching time scale seems to follow the crossing time scale in the cluster while the rapid time scale gets longer for massive galaxies.

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