

S24a AGN number fraction in galaxy groups and clusters at $z < 1.4$ from the Subaru Hyper Suprime-Cam survey

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How do active galactic nuclei (AGNs) affect the formation and evolution of member galaxies and galaxy clusters in the history of the Universe? To tackle this issue, we investigate the dependence of AGN number fraction (f_{AGN}) on cluster redshift (z_{cl}) and distance from the cluster center (R/R_{200}). We focus on more than 27,000 galaxy groups and clusters at $0.1 < z_{\text{cl}} < 1.4$ with more than 1 million member galaxies selected from the Subaru Hyper Suprime-Cam. We identify 2,688 AGNs by combining various AGN selection methods based on infrared (IR), radio, and X-ray data. We find that (i) f_{AGN} increases with z_{cl} and (ii) f_{AGN} decreases with R/R_{200} . The main contributors to the rapid increase of f_{AGN} towards high- z and cluster center are IR- and radio-selected AGNs, respectively. Those results indicate that the emergence of the AGN population depends on the environment and redshift, and galaxy groups and clusters at high- z play an essential role in AGN evolution. We also find that cluster-cluster mergers may not drive AGN activity in at least the cluster center, while we have tentative evidence that cluster-cluster mergers would enhance AGN activity in the outskirts of (particularly massive) galaxy clusters (Hashiguchi, Toba et al. 2023, PASJ, submitted).