Analyzing the role of feedback in AGN quenching through observational and simulated findings.

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Active Galactic Nuclei (AGNs) and quasars play a critical role in regulating galaxy evolution through feedback mechanisms that can significantly suppress star formation. This study investigates the impact of AGN activity on galaxy properties, particularly focusing on the quenching of star formation. Using the IllustrisTNG simulation, we analyze data from the TNG100-1 collection across Snapshots 84–99, corresponding to low redshifts ($z \approx 0–0.3$), and compare it with observational data from the Sloan Digital Sky Survey (SDSS). Key galaxy properties, including stellar mass, black hole mass, and star formation rate (SFR), are examined to understand the relationship between AGN feedback and galaxy evolution. Preliminary results suggest a strong correlation between increased black hole mass and suppressed star formation, consistent with AGN-driven quenching observed in SDSS. These findings highlight the significant role of AGN feedback in shaping the evolutionary pathways of galaxies.