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How Do Post-starburst Galaxies Quench? Analysis of Galaxy Merger

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It is generally believed that galaxies evolved from star-forming to quiescent over time, but the mechanism of how galaxies quench remains a question. Post-starburst galaxies (PSBs) are transitional galaxies that have rapid quenching recently, making them crucial for understanding galaxy quenching. In a theoretical model, it increased SFR during the early stage of galaxy merger. Then, massive inflowing gas produced starbursts at the center. Subsequently, black hole grew rapidly, and remaining gas blew out. Finally, the star formation of galaxy quickly faded and then terminated.
This research used MaNGA IFU spectra which provide spatially resolved information. We use spectra characteristics to identify PSBs in three types, obscured post-starburst (OPSBs), fading post-starburst (FPSBs), and quenched post-starburst (QPSBs), that represent three phases from the end of starburst to quiescent. We found the percentage of PSBs with tidal features and the percentage of Seyferts are higher than those of control samples. Moreover, the percentage of tidal features also decreased overtime, from OPSBs to QPSBs. The absorption line indices EW($H\delta_A$) show that the stellar population at the outskirt is older than the center in QPSBs. In addition, the attenuation is the highest near the centers of OPSBs and then decreases over time, which means there is a large amount of gas gathered in galaxy centers near the time of starburst. These features are consistent with the merger scenario. Therefore, our analysis suggests that rapid quenching is driven by merger in the local universe.

Section

Galaxy/Extragalactic

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