

Secular Evolution in Action: Central Values and Radial Trends in the Stellar Populations of Boxy Bulges

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Boxy bulges are found in half of edge-on galaxies. They are bars viewed edge-on. Their optical spectra give information about their stellar populations. By looking at the variation of these stellar populations within individual bulges, and by comparing them to the stellar populations of unbarred galaxies, we can directly observe the effects of bar-driven secular evolution. We do this for a sample of 28 nearby galaxies and find two main results. (1) At a given velocity dispersion, the central stellar populations of galaxies with boxy bulges are indistinguishable from those of early-type (elliptical and S0) galaxies. Either secular evolution affects stellar populations no differently to monolithic collapse or mergers, or secular evolution is not important in the central regions of these galaxies, despite the fact that they are barred. (2) The radial metallicity gradients of boxy/peanut-shaped bulges are uncorrelated with velocity dispersion and are, on average, shallower than those of unbarred early-type galaxies. This is qualitatively consistent with chemodynamical models of bar formation, in which radial inflow and outflow smears out pre-existing gradients.