

Forming Young Bulges within Existing Disks: Statistical Evidence for External Drivers

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Abstract Contrary to traditional models of galaxy formation, recent observations suggest that some bulges form within preexisting disk galaxies. Such late-epoch, *in situ* bulge formation seems to be linked to disk gas inflow and central star formation, caused by either internal secular processes or galaxy mergers and interactions. We identify a population of galaxies likely to be experiencing active *in situ* bulge growth, using the criterion that the color within r_e is bluer than the outer disk color. Such blue-centered galaxies make up $>10\%$ of star-forming disk galaxies within the Nearby Field Galaxy Survey, a broad survey designed to represent the natural diversity of the low- z galaxy population over a wide range of luminosities. Blue-centered galaxies correlate at 99% confidence with morphological peculiarities suggestive of minor mergers and interactions. Furthermore, several quantitative plausibility arguments indicate that blue-centered evolutionary phases may represent an important mode of *in situ* bulge growth for many disk galaxies, leading to significant changes in bulge-to-disk ratio. If this view is correct, *in situ* bulge growth may be a natural consequence of the repeated galaxy mergers and interactions inherent in hierarchical galaxy formation.