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Secular evolution along the sequence of S0 Hubble types through minor mergers

J. Zamorano[1], M. C. Eliche-Moral[1], A. C. González-García[2], J. Gallego[1], M. Balcells[2,3], J. A. L. Aguerri[2], and M. Prieto[2]

[1]Universidad Complutense de Madrid
[2]Instituto de Astrofísica de Canarias and Universidad de La Laguna
[3]Isaac Newton Group of Telescopes (Spain)

Abstract

Recent studies have argued that galaxy mergers are not important drivers for the evolution of S0's, on the basis that mergers cannot preserve the coupling between the bulge and disk scale-lengths observed in these galaxies and the lack of correlation of their ratio with the S0 Hubble type. We investigate whether the remnants resulting from collision-less N-body simulations of intermediate and minor mergers onto S0 galaxies evolve fulfilling global structural relations observed in these galaxies, or not. We show that all remnants present undisturbed S0 morphologies according to the prescriptions of specialized surveys. The dry intermediate and minor mergers induce noticeable bulge growth (S0c$\longrightarrow$S0b and S0b$\longrightarrow$S0a), but affect negligibly to the bulge and disk scale-lengths. Therefore, if a coupling between these two components exists prior to the merger, the encounter does not break this coupling. This fact provides a simple explanation for the observed lack of correlation between the bulge-to-disk scale-lengths ratio and the S0 Hubble type. These models prove that dry intermediate and minor mergers can induce global structural evolution within the sequence of S0 Hubble types compatible with observations, meaning that these processes should not be discarded from the evolutionary scenarios of S0's just on the basis of the strong bulge-disk coupling observed in these galaxies. This study is published in Eliche-Moral et al. (2012, A&A, in press, arXiv:1209.0782).

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