

The Near-Infrared κ -Space of Early and Late Type Galaxies

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Abstract. We present the near-infrared (H-band: $\lambda = 1.65 \mu\text{m}$) κ -space ($\kappa_1 \propto \log M$, $\kappa_2 \propto \log I_e$, $\kappa_3 \propto \log M/L$) of high surface-brightness early and late type galaxies, based on a sample of 419 objects optically selected in regions of the A262, Cancer, and Virgo clusters and of the Coma Supercluster. We discuss the distribution of the pressure-supported and rotationally-supported systems within this space and the ensuing scaling relations. We analyze the link between galaxy structure and star formation history through a comparison of the loci occupied by galaxies of the Local Universe in both the near-infrared (this work) and optical κ -spaces. Our results support scenarios of galaxy formation and evolution with the following fundamental ingredients: collapsing proto-galactic systems are characterized by i) a bimodal distribution in mass and angular momentum; and by ii) a mass-dependent characteristic star formation time scale.