Galaxy Evolution across the Hubble Time
Proceedings IAU Symposium No. 235, 2006
F. Combes & J. Palouš, eds.

doi:10.1017/S1743921306010258

The Evolution of Disk Galaxy Scaling Relations Since Redshift z = 1

Asmus Böhm[1,2] and Bodo L. Ziegler[2]

[1]Astrophysikalisches Institut Potsdam, An der Sternwarte 16, 14482 Potsdam, Germany
email: aboehm@aip.de

[2]Institut für Astrophysik, Friedrich-Hund-Platz 1, 37077 Göttingen, Germany

Abstract. Based on VLT/FORS spectroscopy and HST/ACS imaging, we have constructed a sample of 125 field spiral galaxies that cover redshifts up to $z = 1$. By deriving the galaxies' luminosities, disk sizes, maximum rotation velocities, stellar masses, total masses, gas-phase metallicities etc., we are able to study the evolution of fundamental scaling relations like the Tully–Fisher relation as a function of cosmic time. While the evolution of most of the galaxies' fundamental parameters is in compliance with a hierarchical structure growth, *the results from stellar population modelling favour a down-sizing scenario in the sense that the average stellar ages in high-mass spirals are older than in low-mass spirals.*

Keywords. galaxies: evolution, galaxies: spiral, galaxies: stellar content

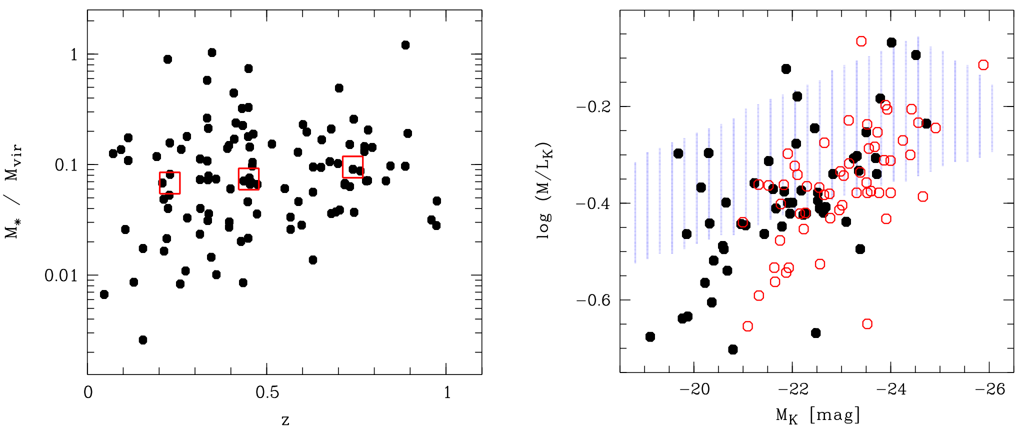

Figure 1. *left:* The observed stellar mass fraction is roughly constant at redshifts $0 \lesssim z \lesssim 1$ (squares give median values in three z-bins), implying the accretion of dark (and probable baryonic) matter, see Böhm & Ziegler (2006) for details. *right:* Stellar mass-to-light ratios of our distant sample at $0.1 < z < 0.45$ (filled circles) and $0.45 < z < 1.0$ (open circles), compared to the parameter range covered by present-day spirals (shaded area) from Bell & de Jong (2001). The K-band M/L ratio evolves stronger in low-luminosity spirals, which is indicative for *"down-sizing"*. Indeed, using single-zone models on a sub-sample at $z > 0.5$, we find that the mean stellar ages are *younger* for low-mass spirals than for high-mass spirals, see Ferreras *et al.* (2004).

References

Bell, E. F., & de Jong, R. S. 2001, *ApJ* 550, 212
Böhm, A., & Ziegler, B. L. 2006, *ApJ*, submitted, *astro-ph/0601505*
Ferreras, I., Silk, J., Böhm, A., & Ziegler, B. L. 2004, *MNRAS* 355, 64