Evolution of the Luminosity Function in the FDF

We use the very deep and homogeneous dataset of the VLT FORS Deep Field [1] (a UBgRIzJKs survey to $I_{AB} \sim 26.8$ over 40 □') to investigate the redshift evolution of the restframe galaxy luminosity functions [2] from the UV (see Fig. 1) to the g'-band up to redshift of $z \sim 5.0$. The catalog contains about 5600 galaxies with accurate photometric redshifts ($\Delta z/(z_{spec}+1) \leq 0.03$) and only $\sim 1\%$ outliers making it possible to derive precise restframe absolute magnitudes. We obtain the following results:

- The characteristic luminosity M^* increases from $\langle z \rangle \sim 0.5$ to $\langle z \rangle \sim 5$ by $\sim$ 3.1 magnitudes in the UV, by $\sim$ 2.6 magnitudes in the u' and by $\sim$ 1.6 magnitudes in the g' and B bands (Fig. 3).
- Simultaneously the characteristic density ϕ^* decreases by about 80 % – 90 % in all analyzed wavebands (Fig. 2).
- The slopes of the luminosity functions in the UV and u' bands are very similar ($\alpha = -1.07 \pm 0.04$) but differ from the slopes in the g' and B bands ($\alpha = -1.25 \pm 0.03$).
- A UV slope of $\alpha \leq -1.6$, as assumed in other studies for $\langle z \rangle \sim 3.0$ and $\langle z \rangle \sim 4.0$, can be excluded on at least a 2σ level.

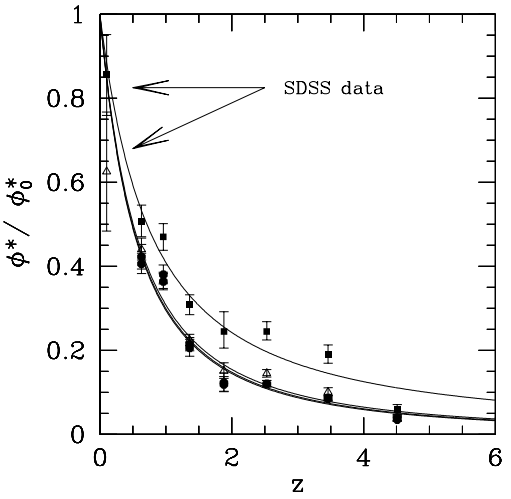

Fig. 2 *Redshift evolution of ϕ^* for the filters g' (filled squares), u' (open triangles) and the two UV bands at 2800 Å and 1500 Å (filled circles). The arrows mark the values for ϕ^* as derived in the Sloan Digital Sky Survey.*

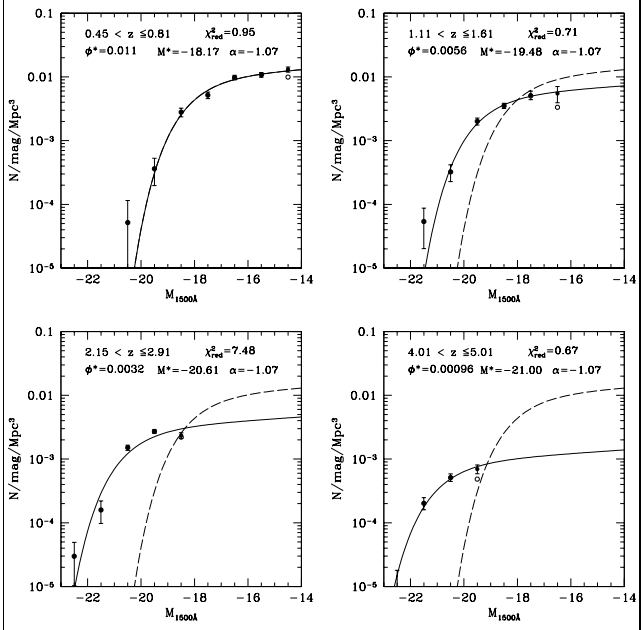

Fig. 1 *Luminosity functions (filled symbols) at 1500 Å for different redshifts. The fitted Schechter functions are shown as solid lines. The Schechter fit for redshift $\langle z \rangle = 0.6$ is indicated by a dashed line.*

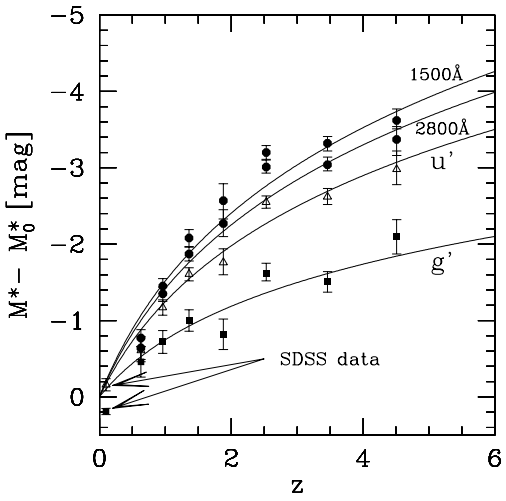

Fig. 3 *Redshift evolution of M^* for the filters g' (filled squares), u' (open triangles) and the two UV bands at 2800 Å and 1500 Å (filled circles). The arrows mark the values for M^* as derived in the Sloan Digital Sky Survey.*

References

[1] J. Heidt, I. Appenzeller, A. Gabasch, et al. *A&A*, 398:49–61, January 2003.

[2] A. Gabasch, R. Bender, S. Seitz, et al *A&A*, 421:41–58, July 2004.

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