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

doi:10.1017/S1743921306005497

Finding Double-Barred Galaxies with HST

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Abstract. We show that the detection of double-barred (S2B) galaxies beyond the nearby universe is possible out to redshifts $0.1 \lesssim z \lesssim 0.5$ with the resolution of the *HST* Advanced Camera for Surveys. We present the most distant S2B currently known, at $z = 0.148$.

Keywords. Galaxies: structure, galaxies: distances and redshifts, galaxies: evolution

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Double-barred (S2B) galaxies could be a mechanism for feeding supermassive black holes by funneling gas to the center (Shlosman *et al.* 1990). Until recently, S2Bs had only been identified in the nearby ($z \leqslant 0.04$) universe, which led us to perform a feasibility study for detecting and analysing them at intermediate redshifts (Lisker *et al.* 2006) with the *HST* Advanced Camera for Surveys (ACS) data of the Great Observatories Origins Deep Survey (Giavalisco *et al.* 2004). We identified the two most distant S2Bs known so far, at redshifts $z = 0.103$ and $z = 0.148$ (Figs. 1 & 2), corresponding to a look-back time of 1.3 and 1.9 Gyr, respectively. Based on local S2B sizes, deep *HST*/ACS and similar surveys have the potential to push the limit for S2B detection out to a look-back time of 5 Gyr. An S2B sample distributed over a large redshift range therefore seems possible in the near future, which would serve as important constraint on S2B formation models.

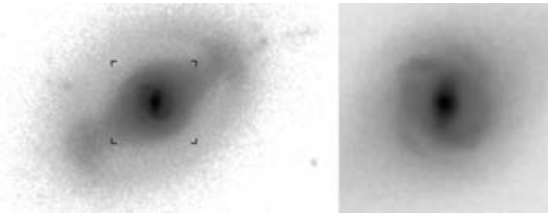

Figure 1. HST-GOODS J033230.93−273923.7 — a double-barred galaxy at $z = 0.148$.

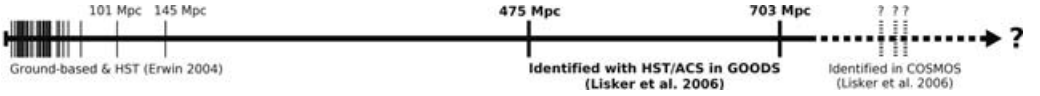

Figure 2. Distance to known double-barred galaxies.

References

Erwin, P. 2004, *A&A* 415, 941.
Giavalisco, M., Ferguson, H.C., Koekemoer, A.M., *et al.* 2004, *ApJ* 600, L93.
Lisker, T., Debattista, V.P., Ferreras, I. & Erwin, P. 2006, *MNRAS* 370, 477.
Shlosman, I., Begelman, M.C. & Frank, J. 1990, *Nature* 345, 679.

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