Morphology of faint blue galaxies: qualitative classification

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The objective of the program was to start understanding the nature of Tyson's population of blue objects by imaging the brightest cases (1989). The data were selected from deep images obtained in 1990-1991 with the NTT and EFOSC 2, a camera at F/11, and a low noise CCD giving a scale of 0.15 arcsec/pixel.

The images are in V, R, and I. They are for distant clusters and control fields. A sample of blue objects was selected according to the following criteria:

– Magnitude $22 \leq V_{\eta=1.7} \leq 24$ observed in V, R, I

– Colour $V - I \leq 0.8$

– Surface brightness $S_m(V) > 23$

– Seeing condition: the images in three colours must have a PSF such as FWHM ≤ 0.7" in I, FWHM ≤ 0.75" in R, and FWHM ≤ 0.85" in V.

– The objects must have the same general appearance in V, R, and I.

A sample of 30 galaxies were observed, and 16 more with a sampling of 0.30 arcsec/pix.

The results are as follows:

1) The objects do not belong to a single class

2) They can be classified according to compactness and multiplicity

3) Three types are observed:

– Irregular

They are the great majority of the objects. The specific parameters of the shape of these objects (orientation, "square" shape, off-centering of the isophotes) are well above the noise. Their shape is similar in V and R, not always in I.

Frequency $> 1/2$

– Compact, unresolved nucleus, wings above the PSF of a star

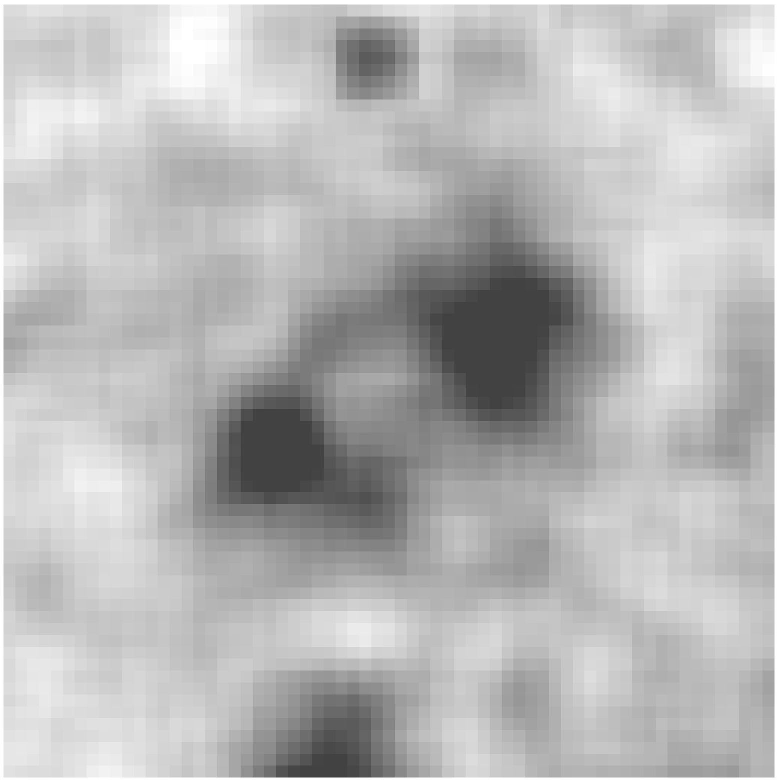

Figure 1: Exemple of faint interacting blue objects (class of multiple morphology)

The objects have a clear peak with FWHM ≈ 0.7" and appear surrounded by a faint envelope, disk or nebulosity. In some cases the peak is better seen in V than in I. Visible in cluster fields at $z \geq 0.5$

Frequency $\leq 1/3$

– Multiple complex morphology

All are blue but at the limit of the colour cut-off. Three of them are quite extended (~ 3") with flat gradient isophotes. The best source of such objects was a cluster candidate at $z = 0.75$ An example is shown in fig. 1.

Frequency $\approx 1/6$

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