Bidimensional Fourier Analysis of a OSUBSGS Spiral Galaxies Sample

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Abstract. By using bidimensional Fourier techniques, we have analyzed H $(1.6\mu m)$ images of a sample of 48 spiral galaxies taken from the OSUBSGS. We found that two-armed spirals $(m = 2)$ are the more important structures in the sample, but some galaxies present higher $m = 1$ (lopsided) or $m = 3$ (three armed spirals). A weak correlation between $m = 2$ pitch angles and Eskridge *et al.* (2002) classification is also evident, but there is no correlation at all between those angles and RC3 classification or Elmegreen arm class.

Traditionally, galaxy morphological classification is done subjectively and mainly using optical B images. Nowadays by using bidimensional Fourier techniques, we can recognize the predominant number of arms in a galaxy light distribution, as well as the pitch angle of the spiral arms. Furthermore, near-infrared images, which better represent the disk mass distribution, can be used. In this contribution we have calculated 2D Fourier coefficients for a subsample of 48 spiral galaxies observed in H $(1.6\mu m)$ from the OSUBSGS (Eskridge *et al.* 2002). Here we only report the pitch angle for the main $m = 2$ component for each galaxy. We plot these values against T morphological types from RC3 (de Vaucouleurs *et al.* 1991), and from Eskridge *et al.* (2002), as well as Elmegreen arm class (Elmegreen & Elmegreen 1987). We can see (Fig. 1) that there is a weak correlation between pitch angles and T types from Eskridge *et al.* (2002), while there is no correlation at all when compared with T types from RC3 or Elmegreen arm class. This is probably due to that Eskridge *et al.* (2002) subjectively classified the same near-infrared images, while RC3 used B images.
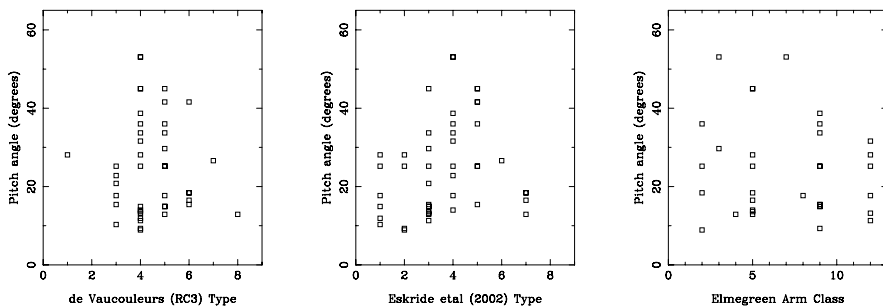
Figure 1. Pitch angles for the $m = 2$ component of the spiral galaxies in our sample plotted against some morphological classifications (see text).

References: de Vaucouleurs *et al.* 1991, Third Reference Catalogue of Bright Galaxies (RC3), New York: Springer; Elmegreen, D.M., Elmegreen, B.G. 1987, ApJ 314, 3; Eskridge, P.B. *et al.* 2002, ApJS 143, 73