

Bars in disk galaxies: spin, gas content and environment

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We use a volume-limited sample of 10,674 disk galaxies drawn from the Sloan Digital Sky Survey Data Release 7 to study the spin, gas content and environment of barred spiral galaxies. The galaxies in our sample are visually classified into galaxies hosting long or short bars, and non-barred galaxies. We find that the spin distributions of these three classes are statistically different, with galaxies hosting long bars with the lowest λ_d values, followed by non-barred galaxies, while galaxies with short bars present typically high spin parameters. The bar fraction presents its maximum at low to intermediate λ_d values for the case of long bars, while the maximum for short bars is at high λ_d . This bi-modality is present also when looking at the bar fraction as a function of the HI gas mass fraction, with a maximum at low gas mass fractions for the case of long bars, and an increase of the bar fraction at high gas mass fractions for galaxies with short bars. In good agreement with previous studies we find longer bars hosted by luminous, massive, red galaxies with low content of cold gas and low values of spin, while short bars are found in low luminosity, low mass, blue galaxies, usually gas rich and with high spin values. Finally we study the environment of barred disk galaxies through the two point cross-correlation function finding no direct evidence for environmental effects on the presence of bars for the galaxies in our sample.