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Bar effects on ionized gas properties and dust content in galaxy centers

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Abstract. Observations and simulations indicate that bars are important agents to transfer material towards galaxy centers. However, observational studies devoted to investigate the effects of bars in galaxy centers are not yet conclusive. We have used a sample (Coelho & Gadotti 2011) of nearby face–on galaxies with available spectra (SDSS database) to investigate the footprints of bars in galaxy centers by analysing the central ionized gas properties of barred and unbarred galaxies separately. We find statistically significant differences in the Hβ Balmer extinction, star formation rate per unit area, in the [S II]λ6717/[S II]λ6731 line ratio, and notably in the N2 parameter (N2 = log([N II]λ6583/Hα)). A deeper analysis reflects that these differences are only relevant for the less massive bulges ($\lesssim 10^{10} M_{\odot}$). These results have important consequences for studies on bulge formation and galaxy evolution.

Keywords. galaxies: spirals - galaxies: morphology - galaxies: evolution - galaxies: bulges

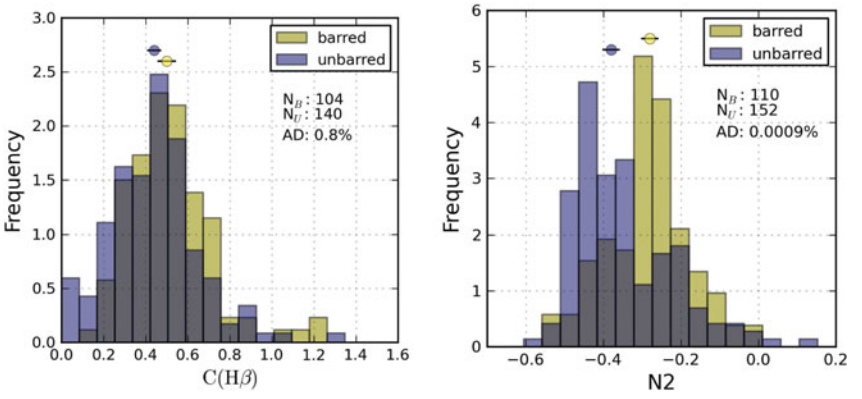

Figure 1. Comparative histograms for the Balmer extinction at the Hβ emission line, C(H$_\beta$), and N2 = log([N II]λ6584/Hα) for all non–AGN barred (yellow, hatched) and unbarred (purple) galaxies of the sample. The number of objects in each sub–sample and the P–values from the Anderson–Darling k–sample test are shown below each figure legend. The distributions are different for barred and unbarred galaxies (P–values below 5%), more importantly in the case of N2, which is on average ∼0.10 dex larger in barred than in unbarred galaxies.

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References

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