

The effects of dust on the derived photometric parameters of disks and bulges in spiral galaxies

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Abstract. Here we present results on the effects of dust on the derived Sérsic index of disks and bulges. This is part of a larger study (see Pastrav *et al.* 2012a, Pastrav *et al.* 2012b) that quantifies the dust effects on all photometric parameters, including scale-lengths, axis-ratios, central surface brightness and effective radii of individual and decomposed (from B/D decomposition) disks and bulges. The effects of dust are derived for both broadband and narrow line (Balmer lines) images. The changes in the derived photometric parameters from their intrinsic values (as seen in the absence of dust) were obtained by fitting simulated images of disks and bulges produced using radiative transfer calculations and the model of Popescu *et al.* (2011). This study follows on the analysis of Möllenhoff *et al.* (2006), who quantified the effects of dust on the photometry of old stellar disks seen at low and intermediate inclination. We extend the study to disks at all inclinations and we investigate the changes in the photometry of young stellar disks and bulges. For the individual components, in the majority of cases: 1) the dust lowers the Sérsic index from its intrinsic value; 2) the Sérsic index decreases as the inclination and the B band central face-on dust opacity, τ_B^f , increase. For the decomposed disks and bulges, dust slightly increases the Sérsic index as compared with the one derived on individual components (e.g. Fig.1); this effect is stronger for higher values of the inclination, τ_B^f and B/D .

Keywords. Galaxy: disk — galaxies: bulges — galaxies: spiral — dust — radiative transfer

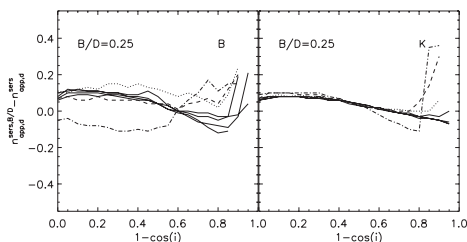


Figure 1. The difference between the derived Sérsic index of a *decomposed galaxy disk* ($B/D=0.25$), $\Delta n_{app,d}^{sers,B/D}$, and the derived Sérsic index of a *single dusty disk image*, $\Delta n_{app,d}^{sers}$. From top to bottom, the curves are plotted for $\tau_B^f = 0.1, 0.3, 0.5, 1.0$ (solid lines), 2.0 (dotted line), 4.0 (long-dashed line), 8.0 (dash-dotted line).

References

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