Following the crumbs: statistical effects of ram pressure in galaxies

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ABSTRACT

We analyse the presence of dust around galaxy group members through the reddening of background quasars. By taking into account quasar colour and their dependence on redshift and angular position, we derive mean quasar colours excess in projected regions around member galaxies and infer the associated dust mass. For disc-like galaxies perpendicular to the plane of the sky, and at groupcentric distances of the order of the virial radius, thus likely to reside in the infall regions of groups, we find systematic colour excess values $e \sim 0.009 \pm 0.004$ for $g - r$ colour. Under the hypothesis of Milky Way dust properties, we derive dust masses of $5.8 \pm 2.5 \times 10^8 M_\odot h^{-1}$ $5.8 \pm 2.5 \times 10^8 M_\odot h^{-1}$, implying that a large fraction of dust is being stripped from galaxies in their path to groups. We also studied the photometry of member galaxies to derive a colour asymmetry relative to the group centre direction from a given galaxy. We conclude that the regions of galaxies facing the centre are bluer, consistent with the effects of gas compression and star formation. We also combine these two procedures finding that galaxies with a small colour asymmetry show the largest amounts of dust towards the external regions compared to a control sample. We conclude that dust removal is very efficient in galaxies on infall. The fact that galaxies redder towards groups centres are associated with the strongest reddening of background quasars suggest that gas removal induced by ram pressure stripping plays a key role in galaxy evolution and dust content.