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# Galaxy Zoo: dust and molecular gas in early-type galaxies with prominent dust lanes

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We study dust and associated molecular gas in 352 nearby early-type galaxies (ETGs) with prominent dust lanes. 65% of these `dusty ETGs' (D-ETGs) are morphologically disturbed, suggesting a merger origin. This is consistent with the D-ETGs residing in lower density environments compared to the controls drawn from the general ETG population. 80% of D-ETGs inhabit the field (compared to 60% of the controls) and <2% inhabit clusters (compared to 10% of the controls). Compared to the controls, D-ETGs exhibit bluer UV-optical colours (indicating enhanced star formation) and an AGN fraction that is more than an order of magnitude greater (indicating higher incidence of nuclear activity). The clumpy dust mass residing in large-scale features is estimated, using the SDSS r-band images, to be 10^{4.5}-10^{6.5} MSun. A comparison to the total (clumpy + diffuse) dust masses- calculated using the far-IR fluxes of 15% of the D-ETGs that are detected by the IRAS- indicates that only ~20% of the dust resides in these large-scale features. The dust masses are several times larger than the maximum value expected from stellar mass loss, ruling out an internal origin. The dust content shows no correlation with the blue luminosity, indicating that it is not related to a galactic scale cooling flow. No correlation is found with the age of the recent starburst, suggesting that the dust is accreted directly in the merger rather than being produced in situ by the triggered star formation. Using molecular gas-to-dust ratios of ETGs in the literature we estimate that the median current and initial molecular gas fraction are ~1.3% and ~4%, respectively. Recent work suggests that the merger activity in nearby ETGs largely involves minor mergers (mass ratios between 1:10 and 1:4). If the IRAS-detected D-ETGs form via this channel, then the original gas fractions of the accreted satellites are 20%-44%. [Abridged]

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