
Dust, metals and gas in the Local Universe: View from DustPedia

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Abstract

The interplay between the dust and the other components of the interstellar medium (ISM) of galaxies, such as metals and gas, is of crucial importance for studies of galaxy formation and evolution. Recent works taking into account all ISM components in nearby galaxies has shown unexpected results and most of them are based on the project **DustPedia**, the most extensive and complete program dedicated to dust in the Local Universe performed so far.

DustPedia has shown –for the first time– that the total dust mass correlates better with the atomic gas (HI) mass than with the molecular one (derived from CO). The correlation between dust and molecular gas mass does not improve taking into account the metallicity in the derivation of molecular gas mass. The strong dust-HI correlation is opposite to what is observed at smaller scales in the ISM, where dust and molecular gas are strongly associated in the star formation (SF) process, while the HI gas is not directly involved with it.

What happens at small scales? What happens at small scales on a galaxy-by-galaxy basis? DustPedia can help us answer these and other questions.

I will present an unprecedented set of scaling relations for a sub-sample of 18 DustPedia galaxies with resolved dust maps, high spatial resolution CO and HI gas maps and homogenized metallicity information, in the range of physical scales of 0.3 – 3.4 kpc. Stellar mass and star-formation rate maps are also available for the entire sample. The results emerging from these scaling relations will be discussed as a function of main galaxy properties (e.g., AGN, SF, HI/H₂, dust-to-gas ratio). They will also provide new observational constraints for cosmological models of galaxy evolution and an updated reference for high-redshift studies.

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