

The Third National Workshop on the SKA Project - The Italian Route to the SKAO Revolution



Contribution ID: 10

Type: **not specified**

DustPedia & MeerKAT: Focus on the HI gas in the star formation process

Wednesday, 6 October 2021 17:20 (20 minutes)

The interstellar medium (ISM) is of vital importance for the lifecycle of galaxies thanks to its ability to condense and form stars, and to be regenerated by stellar evolution. Only a large and coherent dataset of all components of the ISM (dust, atomic and molecular gas, metals) can provide a definitive view of the ISM in galaxies. Thanks to a sample of ~400 DustPedia late-type galaxies, we found *-for the first time-* that the total dust mass correlates better with HI mass than with the molecular one (derived from CO). The strong dust-HI correlation is opposite to what is typically observed at small 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.

We will present the results of an ongoing analysis dedicated to the complete high-resolution (sub-kpc/kpc scales) characterization of the ISM in a sample of 18 nearby spiral DustPedia galaxies covering heterogeneous peculiarities (e.g., bars, AGN, interactions). In particular, we will focus on the galaxy NGC 1365 showing its MeerKAT HI map and comparing it with the CO (ALMA) and dust (DustPedia) ones. Stellar mass and star formation rate maps and metallicity information are also available thanks to the DustPedia database. While at global scales the primary role of the atomic gas is well-defined, high-resolution HI maps are allowing us to re-define it at intrinsic scales of the SF process, where the atomic gas may not be so marginal as was believed until now.

Exploring the cosmic evolution of the gas content of galaxies is a key science driver for SKA. The synergy between DustPedia and MeerKAT is supporting this providing a first important step in understanding how the cold ISM is related to the dust content, and to galaxy capability to form stars.

Research area

HI galaxy science

Primary author: CASASOLA, Viviana (Istituto Nazionale di Astrofisica (INAF))

Co-authors: SERRA, Paolo (Istituto Nazionale di Astrofisica (INAF)); BIANCHI, Simone (Istituto Nazionale di Astrofisica (INAF))

Presenter: CASASOLA, Viviana (Istituto Nazionale di Astrofisica (INAF))

Session Classification: Nearby Universe