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Exploring the millimetre emission in nearby galaxies

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Emission of the nearby galaxies (distance < 30 Mpc) at millimetre wavelengths is a largely uncharted territory. This spectral region lies between the tail of the dust emission and the start of the radio emission (free-free and synchrotron radiation). Observing at these wavelengths is crucial to decompose the millimetre emission into the different emission mechanisms and to investigate if any excess emission, compared to realistic SED (Spectral Energy Distribution) models, exists. In this talk, we will present new observations at 1.15 and 2 mm using the IRAM 30-m telescope and the NIKA2 camera in the framework of the IMEGIN (Interpreting the Millimetre Emission of Galaxies with IRAM and NIKA2) Large Program. This is the first time that 22 nearby galaxies are being observed at high resolution (1.15 and 2mm beams are 11.1" and 17.6" respectively) at millimetre wavelengths. As a pilot study we present the observations of the edge-on galaxy NGC0891, and the spatially resolved SED analysis for the dust and radio emission. For the interpretation of the observations we make use of HerBIE (HiERarchical Bayesian Inference for dust Emission), a state-of-the-art SED fitting code which uses Hierarchical Bayesian statistics in order to eliminate the noise-induced correlations of the inferred parameters. Our analysis shows how the different emission components, at millimetre wavelengths, compare in different areas of the galaxy (disk, halo, star-forming sites) and how they correlate with the gas and dust mass.

Primary author: KATSIOLI, Stavroula

Presenter: KATSIOLI, Stavroula