

The nuclear and extended infrared emission of the Seyfert galaxy NGC 2992 and the interacting system Arp 245.

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Abstract

We present subarcsecond resolution infrared (IR) imaging and mid-IR (MIR) spectroscopic observations of the Seyfert 1.9 galaxy NGC 2992. The data were obtained using the Gemini North telescope and the Gran Telescopio CANARIAS (GTC). In the N -band, the galaxy was observed with a spatial resolution of $0.32''$ (55 pc) and the imaging data reveal faint extended emission out to ~ 3 kpc. By comparing the MIR spectra of the nuclear and extended emission of the galaxy, we conclude that the origin of the extended emission is likely dust in the inner galaxy disk, with some contribution from star formation. We also report arcsecond resolution MIR and far-IR (FIR) imaging of the interacting system Arp 245 (NGC 2992, NGC 2993 and Arp 245 North), taken with the Spitzer Space Telescope and the Herschel Space Observatory. For NGC 2992, we obtained Spitzer MIR and Herschel FIR nuclear fluxes using different methods and compared them with the subarcsecond resolution data. Using imaging data, we find that we can only recover the nuclear fluxes obtained from high angular resolution data at 20 – 25 μm , where emission from the AGN dominates. We fitted the nuclear IR spectral energy distribution (SED) of NGC 2992, including the 7.5 – 13 μm GTC/CanariCam (CC) nuclear spectrum, with clumpy torus models. We then used the best-fitting torus model to decompose the 5 – 30 μm Spitzer/IRS spectrum (~ 630 pc) in AGN and starburst (SB) components, using different SB templates. We find that, whereas at shorter wavelengths the SB component dominates the MIR emission, with 64% contribution at 6 μm , the AGN component reaches 90% at 20 μm . Finally, we reproduced the dust emission in the Arp 245 system using a set of modified blackbodies, from which we derived dust temperatures, star-formation rates (SFRs) and dust masses.