

THE AGN CONTRIBUTION IN THE LUMINOSITY OF STARBURST GALAXIES THROUGH SED MODELS AND SPECTRAL ANALYSIS

A.F. Ramos Padilla¹, Mario-A Higuera-G², and J.R. Martínez-Galarza³

We use multi-wavelength SED and spectral line analysis in a sample of nearby galaxies with different physical conditions in order to investigate how the AGN contribution to the total luminosity of the galaxy affects the estimations of star-forming galaxies.

In order to unveil the presence of hidden active galactic nuclei (AGN) in local galaxies and their interplay with star formation activity, we present a multi-wavelength Spectral Energy Distribution (SED) study of a sample 52 local galaxies ($d < 100$ Mpc): 18 local starburst (3 Seyferts, (Higuera-G. & Ramos P. 2013)), 8 mergers, and 26 AGN. We derive the physical conditions of the gas and dust, and study the relationship between star formation rates (SFRs), fractional contribution from the AGN to the bolometric emission, and stellar mass. We obtain integrated broad-band photometry from the ultraviolet to the far-infrared using archival photometric data from GALEX, SDSS, 2MASS, IRAS, Spitzer and Herschel, where it is available. For a given galaxy, photometry is extracted using the same elliptical aperture in all bands, defined by the size of the galaxy in the GALEX NUV or IRAC1 band, where they are more extended. In addition, for the local starburst systems, we use spectroscopic data from Spitzer IRS in the short-high (SH) mode in the range of 9.89–19.51 μm to obtain fluxes from the Polycyclic Aromatic Hydrocarbons (PAHs) bands as well as the fine-structure lines ([NeII], [NeIII], [NeV], [SIII] and [SIV]) that are tracer of star formation or AGN activity. For the additional mergers and AGNs we use archival line data with published values in the NASA/IPAC Extragalactic Database (NED). We use the state-of-the-art Bayesian SED fitting tools CIGALE (Burgarella, Buat, & Iglesias-Páramo 2005; Noll et al. 2009) and CHIBURST (Martínez-Galarza et al. 2016) to derive statistically constrained physical properties for these galaxies, such as SFR, com-

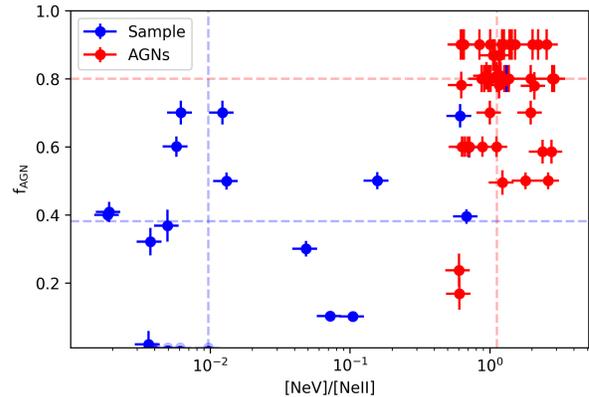


Fig. 1. Comparison of the fraction of AGN and the spectral line ratio $[\text{NeV}]/[\text{NeII}]$ for the sample of starburst galaxies and mergers against the AGN galaxies.

pactness, total luminosities and AGN fraction, and compare these results with the spectral diagnostics of important lines as $[\text{NeV}]$.

We find that including mid-infrared spectral information helps in breaking the degeneracy in bolometric contribution between AGN and star formation galaxies when we use the ratio $[\text{NeV}]/[\text{NeII}]$ and estimations of the AGN fraction and luminosity, as we can see in Figure 1. This is of paramount importance to calibrate SFR estimates that use broad band photometry only, in this case with the help of the estimation of SFR for PAHs (Diamond-Stanic & Rieke 2012). Our estimated stellar masses and SFRs also allow us to locate these galaxies with respect to the so-called star formation main sequence (MS) (Elbaz et al. 2011). Our results are in accordance with morphologically disturbed systems being above the MS.

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¹Leiden Observatory, Niels Bohrweg 2, 2333 CA Leiden, The Netherlands (ramospadilla@strw.leidenuniv.nl).

²Observatorio Astronómico Nacional, Universidad Nacional de Colombia, Carrera 45 No 26-85 Edif. Uriel Gutierrez Bogotá D.C., Colombia (mahiguerag@unal.edu.co).

³Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, MS-51, Cambridge, MA 02138, USA (jmartine@cfa.harvard.edu).