Contribution ID: **116** Type: **Contributed Poster Presentation**

Spectal Energy Distribution (SED) Properties of Active and Non-Active Galaxies in the Green valley.

Tuesday, 16 September 2025 17:00 (5 minutes)

In large optical surveys, a bi-modal distribution of galaxies has been observed at all redshifts based on parameters such as colour, luminosity, stellar mass, star formation rate (SFR), and specific SFR. This distribution separates galaxies into the blue cloud, with active star formation, and the red sequence, with galaxies hosting older stellar populations. The region between the blue cloud and the red sequence; which is less populated by galaxies in optical, is called the green valley. This study shows how active galactic nuclei (AGN) influence star formation and morphological transformation in galaxies within the green valley. We used a sample of the X-ray detected AGN and non-AGN green valley galaxies with FIR emission from the COSMOS field selected in Mahoro et al. (2017) with stellar masses ranging from log M_* = 10.6 – 11.6 M⊙, using 32 photometric filters across UV to FIR wavelengths to extract and fit their spectral energy distributions (SED) with CIGALE. Our findings reveal that FIR-detected AGN galaxies have higher star formation rates (SFRs), with a median log (SFR) of 1.4 M⊙/yr compared to 1.2 M⊙/yr for non-AGN galaxies. AGN galaxies also show higher dust luminosity, with a median of 11.2 L⊙, compared to 11.0 L⊙ in non-AGN galaxies. Despite similar dust masses between the two groups, with median values of 8.6 M⊙ for AGN and 8.5 M⊙ for non-AGN, a strong positive correlation of 0.86 is observed between AGN luminosity and SFR. No significant correlation is found between AGN luminosity and dust mass. Additionally, a higher AGN dust luminosity correlates with a greater AGN fraction in galaxies and a higher dust temperature was observed in AGN compared in non-AGN galaxies. These results implies that for FIR detected AGN with UV-Optical-NIR-MIR-FIR emissions AGN feedback may play a positive role in star formation processes within the green valley rather than negative one.

Keywords: galaxies : active, galaxies : star formation, galaxies: evolution; infrared: galaxies, ultraviolet: galaxies

Abstract Category

Astrophysics & Cosmology

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Session Classification: Poster Room

Track Classification: Physics Research