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**Presentation Requested:** oral

**Category:** Role of AGN in Galaxy Evolution in the ALMA Era

**Question:** Other

## **A New SFR Calibration from the PAH Emission Features and Applications to the AGN Star-Formation Connection**

We report a new SFR calibration using the luminosity of polycyclic aromatic hydrocarbon (PAH) emission in the mid-IR. Our goal is to use the PAHs as a SFR indicator that can be used even in galaxies when the whole bolometric emission is dominated by an active galactic nuclei (AGN), and where every other SFR indicator is contaminated by emission from the AGN. We use mid-IR spectroscopy from the *Spitzer* Infrared Spectrograph (IRS) and optical spectroscopy from various instruments to calibrate the mid-IR PAH features using  $(L_{\text{H}\alpha} + 0.031 \times L_{24\mu\text{m}})$  equivalent to dust-corrected  $\text{H}\alpha$  measurements (Calzetti et al. 2007; Kennicutt et al. 2007). Our sample consists of 129 star-forming galaxies spanning 3 decades in total IR luminosity,  $L_{\text{IR}} = L(8-1000\mu\text{m}) = 10^9-10^{12}L_{\odot}$  over the redshift range from  $0 < z < 0.6$ . We find that the PAH luminosity correlates linearly with the dust-corrected  $\text{H}\alpha$  emission with a small scatter of 0.15 dex. We present the new SFR calibration for the PAH luminosity with errors. We then apply this relation to several samples with previously estimated SFRs from other SFR indicators for comparison. We also take advantage of the fact that the PAH luminosity can be used to estimate the bolometric luminosity contribution from the AGN in a galaxy, which allows us to study star-formation and supermassive blackhole accretion contemporaneously in a galaxy.