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Uncovering the Relationship between Stars and Black Holes in Nearby Luminous Infrared Galaxies: Probing Lines Below the Noise with Stacked *Spitzer*/IRS Spectra MEREDITH STONE, ALEX POPE, JED MCKINNEY, University of Massachusetts Amherst — The co-evolution of stars and supermassive black holes over cosmic time has shaped the history of the Universe, and understanding their relative balance is key to understanding galaxy evolution. Luminous infrared galaxies (LIRGs) in the local Universe are an ideal population to study this relationship thanks to their high star formation rates and a range of emission from active galactic nuclei (AGN, quantified as the AGN fraction). We use *Spitzer*/IRS spectra of LIRGs in the GOALS sample to study mid-infrared spectral lines tracing star formation and black hole accretion. Since many important lines are faint and undetected in the majority of the sample, we constrain the balance of star formation and black hole accretion across GOALS by stacking *Spitzer*/IRS spectra, revealing the relationship between 12.8 micron [NeII], 14.3 micron [NeV], 15.6 micron [NeIII], and 25.9 micron [OIV] luminosity as a function of AGN fraction. This allows us to measure the balance of star formation and black hole accretion across GOALS. We use these results to constrain the contribution of star formation to tracers of black hole accretion in order to improve the accuracy of black hole accretion rate calculations.

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