

Spectral-cube fitting software for Spitzer and JWST studies of active galaxies

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Abstract / Spitzer mid-infrared spectral maps of nearby low-luminosity active galactic nuclei, including Messier 58 and NGC 4258 reveal the physical conditions of the interstellar medium in molecular gas and star-forming regions impacted by AGN feedback. We find that the bulges of these galaxies have large volumes of warm molecular gas that appear to be shock-heated by their radio jets and where star formation appears to be suppressed. These shocked regions emit strongly in H_2 pure-rotational lines, and have low PAH 7.7 μm /PAH 11.3 μm dust emission feature ratios. We developed spectral-cube fitting software in Python that we plan to make available to the community for analysis of future JWST MIRI MRS and NIRSpec IFU spectroscopy of galaxies. Integral field spectroscopy with the James Webb Space Telescope (JWST) will reveal the impact of super-massive black hole feedback on the interstellar medium and galactic star formation over a wide range of cosmic history.

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