

Dust Evolution at Low Metallicity: a JWST study of NGC 6822

Surveys & instruments

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JWST MIRI and NIRCam observations of the isolated metal-poor galaxy NGC 6822 will be obtained in Cycle 1 (#1234) producing an inventory of star formation and dust life cycles at high resolution, similar to Spitzer studies of the Magellanic Clouds (SAGE). NGC 6822 is metal-poor ($[Fe/H]=-1.2$), making it a compelling target for studying stellar evolution as it is thought to have conditions similar to galaxies at the peak star formation epoch in the Universe. In the Local Group, NGC 6822 lies some 500kpc from us, thus with the high sensitivity of the instruments on JWST, we will obtain deep spatially resolved photometry of individual sources which are bright in the infrared. Our survey will detect young stellar objects, evolved stars and both circumstellar and interstellar dust. Of particular interest are the high dust producers - unlike our galaxy where low and intermediate-mass stars provide substantial amounts of dust via mass loss during the Asymptotic Giant Branch (AGB) phase, high redshift galaxies simply lack the time to have <5 solar mass stars evolve onto the AGB and produce dust. As such, studying intermediate to high mass evolved stars in a galaxy whose physical properties resemble those at $Z=2$ may be key to understanding dust formation within galaxies as the universe evolves. Here, we discuss the NGC 6822 JWST program and the tools we are developing from astropy-photutils and modifications to the JWST reduction pipeline to obtain precise PSF photometry in crowded fields which are affected by highly spatially variable diffuse emission.