Young Stellar Objects in L1688: Searching for Evidence of Star Formation Using Infrared Data

Erickson, Jacie (School: South Sevier High School)
Erickson, Joseph (School: South Sevier High School)
Jolley, Bracken (School: South Sevier High School)

Recently released data (2017-present) from the Herschel space telescope for both the PACS and SPIRE instruments provides far-infrared (FIR) data to better analyze and identify young stellar objects (YSOs). L1688 is in the heart of the Rho Ophiuchi cloud complex, a nebulous region, perfect for investigating YSOs. The purpose of this study was to use Herschel data to analyze and look for YSOs in L1688 and to add supporting infrared data to previously studied YSOs. A 90 arcsecond region of space in the L1688 region was selected and sources were identified using the catalogs in the NASA/IPAC Infrared Science Archive (IRSA). Sources were cross-matched by initial catalog position and then visually inspected using DS9 and IRSA viewer. Spectral energy distributions (SEDs) were created and the class of star was determined by looking at the slope between the 2 and 25 micron bands. Color-color and color-magnitude diagrams were created to compare sources with other known YSO plots in order to back up our other findings. Out of the 11 sources we identified in our region, sources 3 and 8 were visible in the PACS bands. Therefore, we were able to add measurements in two bands of Herschel to source 3's SED and in one band for source 8. Of these sources, three were classified as class I or 0, none were flats, three were class II, three were class III, and two were unlikely point sources. The measurements we added in two wavelengths to source 3’s SED and one wavelength to source 8's SED make a stronger case that these sources are YSO candidates in their early stages of formation. This data leads to a greater understanding of YSOs and possibly the origination of the universe itself.

Awards Won: