Analysis of Ice Absorption Features toward YSOs Candidates Using AKARI

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We present a study of near- to mid-infrared spectra (2.5—12μm) of two galactic YSO candidates, which have been discovered in serendipitous spectroscopy in the Galactic plane using the slit-less mode of the InfraRed Camera (IRC) on board AKARI. These sources do not belong to any known star-forming region. Absorption bands of molecular species, including solid phase H_2O, CO_2, CO, and possibly gas phase CO, are seen in the spectra towards both sources.Absorption bands of XCN, organics and silicates are also seen towards one of the sources.

We found that the column densities of the above detected species are large column densities of them, espacially for XCN. These results suggest that the objects are highly embedded class I protostars or class II YSOs with an edge-on (i ~ 70°) disk[1]. However, their SEDs are peculiar as class I or II YSOs since their peaks are located at around 4μm, while usual YSOs show a peak at a much longer wavelength (Figure 1) [2,3]. Their spectral energy distributions (SED) are quite blue as YSOs and no FIR emission has been detected. They are similar to that of class III YSOs, which do not show deep absorption bands of molecular species. Any existing SED models of YSOs cannot well account for the entire infrared SEDs.

On the other hand, the presence of the XCN and organics and CO gas features and no apparent associated nebulosity in the regions suggest that they are not likely background stars.

In this presentation, we will discuss the properties of these objects and their physical implications.

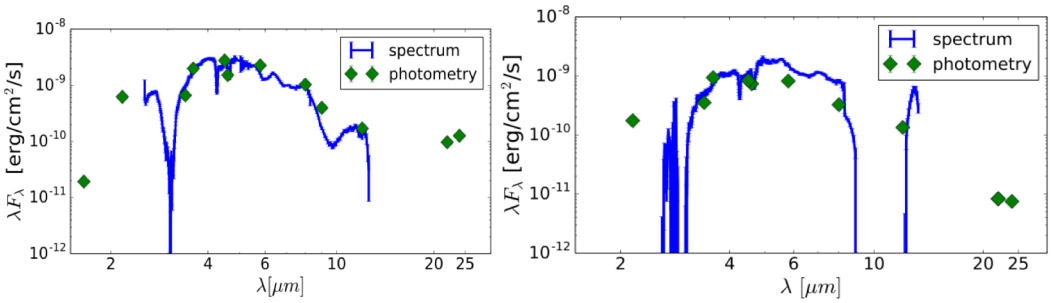

Figure 1: IRC spectra (blue) and photometry (green) of Object 1 (left) and Object 2 (right). The spectrum of Object 2 is reliable only at 3 - 5.5 μm because of overlaps by neighboring sources.

References

[1] K. M. Pontoppidan, et al. 2008, ApJ 622, 463
[2] Megeath, S. T., et al. 2004, ApJS, 154, 367
[3] Allen, L. E., et al. 2007, in Protostars and Planets V, ed. B. Reipurth, D. Jewitt, & K. Keli (Tucson, AZ: Univ. Arizona Press), 361