

**[AIM-15] Long-slit Spectroscopy of Parsec-scale Jets from YSOs**

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We present a study on the parsec-scale jets from young stellar objects using long-slit spectroscopic data obtained from Bohyunsan Optical Astronomy Observatory on 2012 - 2014. Through the position-velocity diagrams, we show the radial velocity variation, peak velocity and velocity width of the outflow from several T Tauri stars and Herbig Ae/Be star. H $\alpha$ , [OI] 6300/6363, [NII] 6548/6584 and [SII] 6716/6731 emission lines are obtained and they show various velocity features. We also compare our result with other data from literatures.

**[AIM-16] "Dust, Ice, and Gas In Time" (DIGIT) Herschel Observations of GSS30-IRS1 in Ophiuchus**

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As a part of the "Dust, Ice, and Gas In Time" (DIGIT) key program on Herschel, we observed GSS30-IRS1, a Class I protostar located in Ophiuchus ( $d = 125$  pc), with Herschel/Photodetector Array Camera and Spectrometer (PACS). More than 70 lines were detected within a wavelength range from 50  $\mu$ m to 200  $\mu$ m: CO lines from J = 14-13 to 41-40, several H<sub>2</sub>O lines of  $E_{up} = 100$  K to 1500 K, 16 transitions of OH rotational lines, and two atomic [O I] lines at 63 and 145  $\mu$ m. The [C II] line, known as a tracer of externally heated gas by the interstellar radiation field, is also detected at 158  $\mu$ m. All lines, except [O I] and [C II], are detected only at the central spaxel of  $9".4 \times 9".4$ . The [O I] emission is extended along a NE-SW orientation, which is consistent with the known outflow direction, while the [C II] line is detected over all spaxels. One possible explanation of the detection of the [C II] line and no correlation of its spatial distribution with any other molecular emission is the existence of the enhanced ISRF nearby GSS30-IRS1. One interesting feature of GSS30-IRS1 is that the continuum emission is extended beyond the point-spread function (PSF), unlike the molecular line emission, indicative of significant external heating. The best-fit continuum model of GSS30-IRS1 with the physical structure including flared disk, envelope, and outflow shows that the internal luminosity is  $11 L_{\odot}$ , and the region is also externally heated by a radiation field enhanced by a factor of 25 compared to the local standard interstellar field.