[구SF-03] A Small group of protostellar objects: L1251C

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We present various observational results toward a small group of Young Stellar Objects (YSOs), L1251C. Observations by Spitzer Space Telescope legacy program "From Molecular Cores to Planet Forming Disks" (c2d; Evans et al. 2003) revealed that there are three YSOs within ~15"in L1251C: IRS1 (Class I), IRS2 (Class II), and IRS3 (Class II). In order to understand the molecular environment around these YSOs, we carried out the KVN single-dish observations in HCO^+ J=1-0, $H^{13}CO^+$ J=1-0, N_2H^+ J=1-0 and HCN J=1-0. ^{12}CO J=1-0 was also mapped in L1251C with the TRAO 14m telescope. Integrated intensity maps of high density tracers such as $H^{13}CO^+$ J=1-0, N_2H^+ J=1-0 and HCN J=1-0 show similar emission distributions, whose peaks are off the positions of YSOs. A compact HCO^+ J=1-0 outflow and an extended ^{12}CO J=1-0 outflow were observed, but their outflow axes are not cosistent (HCO^+: NW-SE, ^{12}CO: EW). However, the highest velocity component of the ^{12}CO J=1-0 outflow shows similar morphology to the HCO^+ J=1-0 outflow, and ~ 23 % of ^{12}CO outflow momentum flux is loaded onto this high velocity component. Furthermore, continuum emission has been observed at 350, 450, 850 ㎛, and 1.3mm. With the KVN single dish, the 22 GHz H_2O maser emission has been also monitored toward L1251C to find variations of the systemic velocity and intensity with time.

[구SF-04] "Dust, Ice, and Gas In Time" (DIGIT) Herschel observations of GSS30-IRS1

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As part of the DIGIT key program, we observed GSS30-IRS1, a Class I object located in Ophiuchus (d=125 pc), with Herschel-PACS. More than 70 lines were detected in 50-200 micron band including CO, OH, H2O, and [OI]. All lines, except for [OI], were detected only at the central spaxel of 9.4"x9.4" while the [OI] emission is extended along the NE-SW direction. One interesting feature in GSS30-IRS1 is that the continuum is extended beyond PSF, unlike line emission. It suggests that the external heating is important in GSS30-IRS1. For detail analysis of line fluxes, we apply the non-LTE LVG model, RADEX as well as simple rotational diagrams. We also use the Monte Carlo radiative transfer package, RADMC-3D to understand the heating mechanism of dust grains around GSS30-IRS1. We will discuss about heating and cooling processes associated with GSS30-IRS1.