[구SF-01] Identication of L328-IRS as a Proto-Brown Dwarf

Chang Won Lee[1], Mi-Ryang Kim[1,2], Gwanjeong Kim[1,3], Masao Siato[4],
Philip C. Myers[5] & Yasutaka Kurono[4]
[1]*Korea Astronomy & Space Science Institute,* [2]*Chungbuk National University*
[3]*University of Science & Technology,* [4]*National Astronomical Observatory of Japan*
[5]*Harvard-Smithsonian Center for Astrophysics*

Our understanding of how brown dwarfs form is limited by observational evidence. We report identification of a L328-IRS as a proto- brown dwarf embedded in an isolated dense molecular core. This source exhibits typical properties of a protostar, however, its luminosity (~0.05 L⊙) is far below than expected from the least massive protostar by the standard star formation theory. The most likely mass accretion rate (~2.4 10-7 M⊙ yr-1) inferred from its small bipolar outflow is an order of magnitude less than the canonical value for a protostar. The mass available in its envelope is less than 0.1 M⊙. These points suggest that L328-IRS will accrete the mass of a brown dwarf, but not that of a star. L328 is found to be fairly well isolated from other nearby clouds and seems to be forming three sub-cores simultaneously through a gravitational fragmentation process. Altogether with these, our direct detection of inward motions in L328 which harbors this proto-brown dwarf clearly supports the idea that a brown dwarf forms like a normal star.

[구SF-02] Outflow properties of 24 DIGITembedded soruces

Seonmi Kang[1], Jeong-Eun Lee[1], Minho Choi[2], Neal J. Evans[3], Michael M. Dunham[4]
[1]*School of Space Research, Kyung Hee University,* [2]*Korea Astronomy and Space Science Institute,* [3]*Department of Astronomy, The University of Texas at Austin*
[4]*Department of Astronomy, Yale University*

We present a study of outflows on 24 embedded young stellar objects (YSOs), which are selected from the sources of the Dust, Ice, and Gas in Time (DIGIT) Herschel key program. Molecular outflow activity, which is believed to have strong dependence on accretion process, is the most powerful in the early embedded phase of star formation and declines as the central protostars evolve to the main sequence stage. In order to study the relation between the CO outflow observed in low J transitions and the properties of protostars, we mapped the CO outows of the selected targets in J = 1-0 and J = 2-1 lines with the 14-m TRAO telescope and the 6-m SRAO telescope, respectively. We estimate CO outflow momentum fluxes (Fco) and compare with bolometric luminosity, Lbol, bolometric temperature, Tbol, and the FIR molecular line luminosities of CO, H_2O, OH and [O I] , which were detected by the Herschel-PACS observations. We found that Fco_{1-0} is greater than Fco_{2-1}, and the mean ratio is about 2. L1455-IRS3 and IRAM04191 have high Fco in spite of low L_{bol}. The well known correlation between Fco and L_{bol}. is not very evident from all our samples. However, Fco and L_{bol}. show a rather strong correlation if L1455-IRS3 and IRAM04191 are excluded. Fco shows little correlation with FIR line luminosities of individual species, while the total FIR line luminosity summed over CO, H_2O, OH, and [OI] lines seems to have some correlation. In addition, we report 22 GHz H_2O, and 44 GHz CH_3OH maser line detections in four sources out of the 24 YSOs.