[구IM-01] Optical Long-slit Spectroscopy of Parsec-scale Jets from DG Tau

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We present the result of a long-slit spectroscopic study of DG Tau, which is known to emanate parsec-scale outflows. To study the kinematics and physical properties of the jet, we obtained the optical emission lines of Hα, [OI], [NII], and [SII] from HH 158 and HH 702 using the long-slit spectrograph at Bohyunsan Optical Astronomical Observatory. HH 158 shows the peak radial velocity in a range of ~ − 270 to − 30 km s−1. HH 702, located at 11′ away from DG Tau shows the velocity of ~ − 80 km s−1. The proper motion velocities of detected knots are estimated through the comparisons with the locations of those knots in the previous studies. We also examine the variations of physical parameters depending on the velocity distribution and the distance from the source using line ratio maps derived from obtained forbidden emission lines.

[구IM-02] Chemical Differentiation of $C^{34}S$ and N_2H^+ in Dense Starless Cores

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CS molecule as an important tracer for studying inward motions in dense cores is known to be adsorbed onto dusts in cold (T~10K) dense cores, resulting in its significant depletion in the central region of the cores which may hamper a proper study of kinematics stage of star formation. In this study we choose five 'evolved' dense starless cores, L1544, L1552, L1689B, L694-2 and L1197, to investigate how depletion of CS molecule is significant and how the molecule differentiates depending on the evolutional status of the dense cores, by using a rare isotopomer C34S. We performed mapping observations in C34S (J=2-1) and N2H+ (J=1-0) with Nobeyama 45 m telescope, and compared 850 μm continuum data as a reference of the density distribution of the dense cores. Our data confirm the claim that CS molecule generally depletes out in the central region in dense starless cores, while N2H+ keeps abundant as they get evolved. All of integrated intensity maps show 'semi-ring-like' depletion holes in CS, and all of abundance radial profiles show decrease toward center. The CS depletion and molecular chemical differentiation seems to depend on the evolutional status in dense cores. The evolved cores shows low abundance at both central and outer regions, implying that in the case of highly evolved cores CS freeze-out occurs over the most area of the cores.