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野辺山 45 m 鏡レガシープロジェクト : L1527 のラインサーベイ観測

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L1527 is a low-mass star forming region showing a peculiar chemistry called warm carbon-chain chemistry (WCCC). In this source, various carbon-chain molecules are abundant in the vicinity of the protostar. It is proposed that they are produced near the protostar, triggered by evaporation of CH_4 from grain mantles (Sakai et al. 2008). This is in contrast to the conventional carbon-chain chemistry in cold clouds (e.g. Suzuki et al. 1992). In order to explore the mechanisms of WCCC, the complete understanding of the chemical composition of L1527 by an unbiased spectral line survey is essential.

With this motivation, we are conducting spectral line surveys in the 3 mm band toward L1527 with the Nobeyama 45 m telescope, as one of the NRO projects. The frequency range so far observed is from 83 to 92 GHz with the rms noise level of less than 5 mK. Spectral lines of various carbon-chain molecules and their related species have been detected as well as those of the fundamental molecules. They are SO, HCN, H^{13}CN , HC^{15}N , HNC, HN^{13}C , HCO^+ , H^{13}CO^+ , HC^{18}O^+ , HCS^+ , CCH, $\text{CCH}^{(13)\text{C}}$, HCO, CCS, *c*- C_3H , C_3D , C_3O , HCO_2^+ , HC_3N , $\text{HC}_3\text{N}^{(13)\text{C}}$, DC_3N , *c*- C_3H_2 , *c*- $\text{C}_3\text{H}_2^{(13)\text{C}}$, C_4D , C_4H_2 , HC_5N , CH_3CN , CH_3CCH , and so on. On the other hand, spectral lines of saturated organic molecules such as HCOOCH_3 and $\text{C}_2\text{H}_5\text{CN}$ which are seen in the hot corino sources are not found. The result shows a clear chemical difference between the WCCC and hot corino sources.