A Search for Cloud Cores Affected by Shocked Carbon Chain Chemistry in L1251

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Abstract
We searched for shocked carbon chain chemistry (SCCC) sources with C3S abundances surpassing those of HC5N toward the dark cloud L1251, using the Effelsberg telescope at the K band (18-26 GHz). L1251-1 and L1251-3 are identified as the most promising SCCC sources. The two sources harbor young stellar objects. We conducted mapping observations toward L1251-A, the western tail of L1251, at λ ∼ 3 mm with the Purple Mountain Observatory 13.7 m and the Nobeyama Radio Observatory 45 m telescopes in lines of C2H, N2H+, CS, HCO+, SO, HC3N, and C18O as well as in CO 3-2 using the James Clerk Maxwell Telescope (JCMT). The spectral data were combined with archival data including Spitzer and Herschel continuum maps for further analysis. Filamentary substructures labeled as F1-F6 were extracted in L1251, with F1 being associated with L1251-A hosting L1251-1. The peak positions of dense gas traced by HCO+ are misaligned relative to those of the dust clumps. Episodic outflows are common in this region. The twisted morphology of F1 and velocity distribution along L1251-A may originate from stellar feedback. SCCC in L1251-1 may have been caused by outflow activities originated from the infrared source IRS1. The signposts of ongoing SCCC and the broadened line widths of C3S and C4H in L1251-1 as well as the distribution of HC3N are also related to outflow activities in this region. L1251-1 (IRS1) together with the previously identified SCCC source IRS3 demonstrate that L1251-A is an excellent region to study SCCC.