P117a Mopra mapping observations with multi-lines of dense cores in Lupus I

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Recently, high sensitivity mappings of nearby molecular clouds in far-infrared and submillimeter bands with Hershel and AzTEC/ASTE show ubiquitous existence of the filamentary structures with 0.1-pc uniform width. It is important to investigate dense core formation from large scale structure via fragmentation. We have conducted MOPRA multi-line mapping observations covered on 0.02 - 0.2 pc scale of 8 dense cores in a filamentary cloud of nearby Lupus I at 140 pc. A class 0/I protostellar core IRAS 15398-3359 is included as a sample, which has an adjacent prestellar core with the separation of 0.13pc in the west. The maps of N_2H^+, HNC, HC_3N show well-associated with each core. The velocity field of HC_3N seems to be opposite rotating; 1.2 km/s/pc from north-west to south-east around protostellar core and 0.8 km/s/pc from east to west around presteller core. The filament will be fragmentized and collapsed to dense cores when the line density is over 2Cs/G (where Cs is sound speed and G is gravitational constant). If that velocity gradient was caused by such situation, it should be red-blue-red-blue across two dense cores but the observed image is not consistent with this scenario, which requires that the filament structure would be extremely curved with skew angle. Although we cannot reject the collapsing interruption, those results suggest the spin-up rotating picture separated from large-scale structure.