

A Mapping Survey for A Search of Extended Inwards Motion in Starless Cores in CS (2-1) and N₂H⁺ (1-0)

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We present data of a mapping survey of 'starless' cores in optically thick and thin tracers, such as CS (2-1) and N₂H⁺(1-0) lines to search for candidates with symptom of extended infall. Our targets were selected from the single pointing survey by Lee, Myers, & Tafalla (1999) and from the catalog by Lee & Myers (1999) which is the collection of dark dense cores based on the optical obscuration. We have mapped a total of 56 starless cores using FCRAO 14m telescope equipped with focal plane array systems, i.e., QUARRY (15 elements) for the 1997 season and SEQUOIA (16 elements) for 1997 - 1999 seasons. The system temperatures were typically around 300 - 400 K for the QUARRY, and 140 - 180 K for the SEQUOIA. The auto correlators with spectral resolution of 0.03 - 0.06 km s⁻¹ were used. From this survey, fifteen starless cores were found to have a consistently extended infall asymmetry. The extension that the infall occurs in the core is always larger than the Half Maximum size of the integrated intensity map of N₂H⁺, and the usual infall size is about 0.1 - 0.4 pc. Four starless cores show a mixture of infall and outflow, and one source (L1521F) has extended outflow asymmetry. Our observations suggest that the well known extended infall candidate - 'L1544' (Tafalla 1988; Williams 1999) is not the only case having extended infall asymmetry in starless cores, and so the extended infall phenomenon should be a necessary stage in the dense core formation. Detailed analysis of data is in progress.