

P119a Probing the growth of IC5146 by filamentary accretion

Yoshito Shimajiri (CEA), Ph. André (CEA), D. Arzoumanian (IAS), V. Könyves (CEA), P. Palmeirim (CEA), A. Roy (CEA), A. Maury (CEA), and E. Ntormousi (CEA)

The observations of the Herschel Gould Belt survey project revealed an omnipresence of parsec-scale filaments in molecular clouds (André et al. 2010; Arzoumanian et al. 2011). Detailed analysis of the radial column density profiles shows that filaments are characterized by a quasi-uniform distribution with a typical FWHM value of 0.1 pc (Arzoumanian et al. 2013). This characteristic width of 0.1 pc suggests that filaments may have formed as a result of dissipation of large-scale turbulence (Padoan et al. 2001). Furthermore, a lot of sub filaments are distributed around the main filament (Peretto et al. 2012; Palmeirim et al. 2013). These morphologies suggest that accretion flows are feeding the main filament from the surrounding cloud material. However, investigating the velocity structure of the filaments and the surrounding medium is crucial to confirm this scenario.

We have carried out the mapping observations toward the thermally supercritical filaments in the IC 5146 region using the Nobeyama 45 m telescope. We found sub filaments distributed toward perpendicular to the main filaments. The velocity structures of a simple inflowing-gas model have good agreements with those of the observations, suggesting that the sub filaments are inflowing into the main filament and subsequently growing the main filament. These results strongly support the scenario that supercritical filaments undergo gravitational contraction and increase in mass per unit length through accretion of background material.