# The interplay of turbulence and magnetic fields in the non–star-forming Pipe nebula

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**ABSTRACT**

The Pipe Nebula is a nearby, filamentary shaped, molecular cloud (≈ 145 pc) in which star formation is concentrated in the western end of the cloud, the B59 region. The eastern part of the cloud has no star formation. The magnetic field (projected) morphology is well constrained through both extinction and emission dust polarization measurements, showing well ordered field lines in the non–star-forming part of the cloud, compared to less ordered ones towards B59. Furthermore, kinematic studies of the eastern part indicate that it could be decomposed into two colliding filamentary clouds, 3.5 km/s apart in projected velocity. This converging flow region thus constitutes a high turbulence, strong magnetic field test case to be compared with numerical simulations.
We would like to present in a talk the first $^{12}$CO(1-0), sub-arcmin resolution (22" HPBW) large-scale (0.5x0.7 deg) map of the converging flow region, obtained with the IRAM-30m antenna. The preliminary result confirms the extremely dynamic nature of the region. The $^{12}$CO(1-0), covering 4.5 km/s, have up to 5 velocity components, showing several structures connected in physical and velocity space. We performed longer integrations towards dense cores identified based on dust extinction and emission, in $^{12}$CO(1-0), (2-1), and isotopologues, as well as $HCO^+$, $N2H^+$, HCN, and CN. Our preliminary results indicate that these targets are unlikely to be dense cores. This suggests some limitation of automatic core detection based on dust in highly turbulent clouds, with consequences on the core mass function in such environments. The large area mapped in $^{12}$CO also offers the opportunity to explore the relative orientation of gaseous filaments with respect to the (projected) magnetic field lines, in the transition between tenuous to dense. Analysis of the velocity field in terms of centroid velocity increments (CVI) show elongated, 0.4-parsec long, coherent structures of extreme CVI, reminiscent of what is observed in the Polaris, non–star-forming cloud.