is likely low-density filamentary material associated with the cloud. The core envelope appears to be located in correspondence of the merger of these filamentary structures.
- We see a velocity gradient along the filament in the DCO^+ (3-2) gas. Therefore, we measured the ongoing accretion material toward the protostar core in this gas, $\dot{M}_{acc} = 9.7 \times 10^{-7} M_{\odot} yr^{-1}$, where the accretion rate is expected to be accurate within a factor of 2.
- The mean velocity gradient is roughly 5.1 $km\,s^{-1}\,pc^{-1}$ measured in DCO^+ (3-2) around the protostar core, which is linked to the rotation of the core. This velocity gradient at the position of the protostar is in the east–west direction, oriented approximately perpendicular to the bipolar outflow previously found.
- Line widths of DCO^+ (3-2) increase toward the position of the protostar, probably due to protostellar feedback.
- We observed a velocity shift between neutral and ionized species. A higher velocity is always present in the $C^{18}O$ (2-1) data compared to the DCO^+ (3-2) data. The mean velocity difference, $V_{lsr}(C^{18}O)$ - $V_{lsr}(DCO^+)$, is equal to 0.13 $km\,s^{-1}$ across the full filament. This is consistent with a model of collision between filaments that is still ongoing. The velocity shift between the $C^{18}O$ (2-1) and DCO^+ (3-2) illustrates the relative motion of the dense gas, traced by DCO^+ (3-2), and the surrounding less dense envelope, traced by $C^{18}O$ (2-1).

Further observational investigations are needed to determine in more detail the connections within the kinematics and magnetic field in this source.

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