P143a Massive Core/Star Formation Triggered by Cloud-Cloud Collision III: Effect of Magnetic Field

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We study the effect of magnetic field on the massive core/star formation triggered by the cloud-cloud collision. We perform sub-parsec magnetohydrodynamic simulations of two unequal colliding, turbulent molecular clouds. We assume clouds in uniform magnetic fields of various strengths and directions with respect to collision axis. We generate turbulent magnetic fields by developing turbulent motion in initial uniform clouds before the collision. During the collision of the clouds, the shock wave forms at the interface of the clouds, and dense cores form in the shocked cloud medium. In the past meetings, we have reported the results for 10 km s^{-1} collision speed cases in which more massive dense bound cores are formed in the 4 µG initial magnetic field than the 0.1 µG. This should be partly because strong magnetic fields suppress the nonlinear thin shell instability and support the low mass dense cores against self-gravity. We study effect of magnetic field on the massive core/star formation in higher collision speed case of 20 km s^{-1} since typically observed collision speeds are in range of 10-20 km s^{-1}. We found that the collision proceeds too quickly to form massive dense cores in the 4 µG initial magnetic field. In 10 µG initial magnetic field, we found the formation of massive but unbound cores. We simulate larger colliding clouds in this case. We will discuss massive core/star formation in high-speed colliding molecular clouds.