P129a Massive Core Formation in Magnetized, Turbulent, High-speed Colliding Clouds

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We make magnetohydrodynamic simulations of magnetized, turbulent, colliding clouds to study the effect of high collision speed on massive core formation. We assume two combinations of colliding clouds, small (1×10^3 $M_\odot$), and medium (8×10^3 $M_\odot$) clouds, and small and large (2.3×10^4 $M_\odot$) clouds. The clouds are initially spherical, uniform (3.7×10^{-22} g cm^{-3}) and are immersed in a uniform magnetic field of 4 µG. Turbulence is generated in the clouds. After the development of turbulence, collision speed of 10 or 20 km s^{-1} is given. We identify gas clumps with gas densities greater than 5×10^{-20} g cm^{-3} as dense cores and investigate their mass evolution and gravitational boundness.

For the small and medium clouds, massive core formation is suppressed in the 20 km s^{-1} collision, whereas massive core formation occurs in the 10 km s^{-1} collision. In this 20 km s^{-1} collision, the earlier cloud crossing time epoch leads to suppression of massive core formation. We simulate 20 km s^{-1} collision of the small and large clouds, since cloud crossing time in this collision is longer than the small and medium clouds collision with the same speed. We found more massive core formation in this case. We will discuss the condition of massive core formation using important parameters like the magnetic field, collision speed, and column density in the colliding clouds.