

P01a On the contraction of protostellar clouds with different metallicities

大向 一行 (京都大 物理)

We examine the thermal and chemical evolution of gravitationally contracting protostellar clouds of varying metallicity (from metal-free to pop I composition gas). Before the clouds become opaque to continuum radiation, they evolve differently for different metallicity gas, namely at higher temperatures for lower metallicity clouds. However, during the adiabatic contraction phase of transient cores, the evolutionary paths of the clouds converge to a curve that is determined by fundamental physical constants only, and they coincide thereafter, regardless of their metallicity. Therefore, the physical dimension of the stellar core at the formation is the same for gas of any metallicity. The mass accretion rate onto the stellar core depends on metallicity and is higher for a lower metallicity cloud, reflecting the higher temperature of the outer envelope.