

Q11a Cloud-Cloud Collision in the Galactic Center Arc II

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We performed a search of cloud-cloud collision (CCC) sites in the Sagittarius A molecular cloud (SgrAMC) based on the survey observations using the NRO 45-m telescope in the CS and SiO emission lines. We found candidates being abundant in shocked molecular gas in the Galactic Center Arc (GCA). One of them, M0.014-0.054, is located in the mapping area of our previous ALMA mosaic observation. We explored M0.014-0.054 in the CS $J = 2 - 1$, C³⁴S $J = 2 - 1$, SiO $v = 0 J = 2 - 1$, H¹³CO⁺ $J = 1 - 0$ emission lines and fainter emission lines. M0.014-0.054 is likely formed by the CCC between the vertical molecular filaments (VP) of the GCA, and other molecular filaments along Galactic longitude. The bridging features between these colliding filaments on the PV diagram are found, which are the characteristics expected in CCC sites. We also found continuum compact objects in M0.014-0.054, which have no counterpart in the H42 α recombination line. They are detected in the SO emission line, and would be “Hot Molecular Core (HMC)”s. Because the LTE mass of one HMC is larger than the virial mass, it is bound gravitationally. This is also detected in the CCS emission line. The embedded star would be too young to ionize the surrounding molecular gas. The VP is traced by poloidal magnetic field. Because the strength of the magnetic field is estimated to be $\sim m$ Gauss using the CF method, the VP is supported against fragmentation. The star formation in the HMC of M0.014-0.054 is likely induced by the CCC between the stable filaments, which may be a common mechanism in the SgrAMC.