

Magnetohydrodynamic Simulations of Galactic Prominence with Cooling/Heating processes

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Abstract

We present two dimensional resistive MHD simulations to show the possible formation mechanism of molecular loops observed by Fukui et al. (2006) at Galactic central region. We speculate that formation process of molecular loops is similar to the solar prominence. Kaneko and Yokoyama (2014) demonstrated that prominence can be formed by imposing converge and shear motion at foot points of magnetic arch anchored to the solar surface and adapting radiative cooling. In our study, we adapted similar setting in Galactic center scale (~few hundreds pc) and applied cooling and heating function summarized by Inoue et al. (2006). We found that current sheets can form inside the magnetic arch expanding by the imposed motion at foot points. Magnetic reconnection taking place in the current sheet forms rising dense plasmoids. In our simulation, thermal instability triggered within the plasmoids can form dense filaments floating at high Galactic latitude.