[S8-3] A STUDY OF MOLECULAR CLOUD ASSOCIATED WITH AN HII REGION S156

Meejoo Kang[1], Youngung Lee[2]
[1]*Department of astronomy and Space Science, Chungnam National University*
[2]*Korea Astronomy Observatory*

We have conducted observations toward a molecular cloud associated with the HII region S156 in $^{13}CO(1-0)$, $C^{18}O(1-0)$, and CS(2-1) using TRAO 14 m telescope. We estimated the physical properties of the cloud combining with existing $^{12}CO(1-0)$ data of the Outer Galaxy Survey. We found that there is a clear sign of interaction between the HII region and molecular gas. We have obtained masses of the molecular cloud, using three different techniques, and we found the most reasonable mass is likely to be 1.3×10^5 $M_{\odot}$, using a conversion factor of $X=1.9 \times 10^{20}$ cm^{-2} $(K\ km\ s^{-1})^{-1}$, which is similar to virial mass. This implies that the cloud is gravitationally bound even though it is closely associated with an HII region. In addition, we found the existence of outflows and thus, there are star formation activities other than the main HII region. According to relatively strong CS emission and several mid-IR emission peaks, it is evident that more star forming activies are going on in this region.

[S8-4] An Magnetohydrodynamics Code for Astrophysical Flows

Sang Min Lee[1], Daehee Kim[2]
[1]*Supercomputing Application Technology Department, KISTI Supercomputing Center*
[2]*Korea Advanced Institute of Science and Technology*

We present a high-order accurate weighted essentially non-oscillatory (WENO) scheme for solving isothermal magnetohydrodynamics (IMHD) problems in astrophysics. The WENO scheme conforms to the same idea of an essentially non-oscillatory (ENO) scheme with high-order accuracy. We have constructed an one-dimensional code which is based on an explicit finite difference method on an Eulerian grid. The WENO scheme can be easily applied to multidimensional codes through a Strang-type dimensional splitting. Using the multidimensional code, we have included a scheme that enforces $\nabla \cdot \vec{B} = 0$ condition at every time step. Numerical results are shown to perform well for IMHD shock tube problems. Strong shocks are resolved sharply. Numerical dissipation has been estimated through the decay test of a two-dimensional Alfv\'en wave. It has been found to be significantly smaller than that of the isothermal magnetohydrodynamics code based on total diminishing variation (TVD) scheme. As examples of astrophysical applications, we have simulated MHD turbulence energy decay tests and the nonlinear evolution of the two-dimensional Parker instability under a uniform gravity.