CO Observations of S301

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CO observations were performed in the region of optical H II region, S301. A large molecular cloud appeared to be associated with the H II region. The cloud is composed of two denser components facing the H II region, and has a ridge structure elongated along the north-south direction. The masses of each component are 1.9×10^3 and $3.2\times10^3 M_\odot$, and total mass of the cloud is up to $8.7\times10^3 M_\odot$. ^{13}CO observations show that the denser components are composed of several clumps. But there is no signature of star formation; no molecular outflows, no IRAS point sources corresponding to the clumps, and no maser souces. The most interesting feature in CO observations is that ^{13}CO clumps form a shell structure of 8′ diameter centered at (-4, -8) offset position, but the origin is not clear.

We will discuss the relationship between the optical H II region and its parent cloud in view of champagne flow.

The Brightest Stars in Galaxies as Distance Indicators

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The brightest stars in galaxies have been used as distance indicators since Hubble. However, the accuracy of the brightest stars for distance estimates has been controversial. Recently, Rozanski and Rowan-Robinson [1994 : MNRAS, 271, 530] argued large errors in the distance determination : 0.58 mag and 0.90 mag, respectively, for the brightest red stars and the brightest blue stars, while Karachentsev and Tikhonov [1994 : A&A, 286, 718] suggested much smaller errors in the distance determination : 0.37 mag for the brightest red stars and 0.46 mag for the brightest blue stars. The reasons for these conflicting results are not yet known.

In this study we have investigated the accuracy of this method using a sample of 17 galaxies for which Cepheid distances are known and reliable photometry of the brightest stars are available. We have obtained the relations of the luminosities of the three brightest stars and the $M_{B(gal)}$ of the parent galaxies : $< M_V(3) >_{RSG}=0.21M^T_B-3.84$, $\sigma(M_V)=0.37$ mag, $\delta(m-M)_0=0.47$ mag for the brightest red stars and $< M_B(3) >_{BSG}=0.30M^T_B-3.02$, $\sigma(M_B)=0.55$ mag, $\delta(m-M)_0=0.79$ mag for the brightest blue stars.

In addition, the accuracies of the red supergiant for distance estimates for seven common galaxies (LMC, NGC 6822, IC 1613, M33, Sextans A, NGC 2403, M31) are estimated to be 0.61, 0.51, 0.36, 0.34, 0.33 mag, repectively, for the B, V, J, H, K band, showing the errors in the distance determination are reduced when the red supergiants are observed at the longer wavelength. In conclusion the brightest red stars are considered to be useful for determining the distances to galaxies.