

Formaldehyde observations at XAO

Gang Wu, Jarken Esimbek, Jian-Jun Zhou and Wei-Guang Ji

Xinjiang Astronomical Observatory, CAS
Postbus 830011, 150 Science 1-Street, Urumuqi, China
email: wug@xao.ac.cn

Abstract. In recent years our team has performed $\text{H}_2\text{CO}(1_{10} - 1_{11})$ observations towards GMCs and HII regions with the Xinjiang Astronomical Observatory, CAS. Here, we provide a summary of these observations. More than 200 new formaldehyde sources are detected, 8 extended GMC have been mapped, kinetic distances, Galactic structure and a related discussion are provided.

Keywords. ISM: clouds — HII regions

1. Introduction

Owing to the extremely low excitation temperature (collision with neutral particles, proposed by Townes & Cheung 1969) and relative low density, H_2CO is commonly considered as a good tracer of low to warm temperatures and relatively dense nebulae.

2. Observations

We use the Nanshan 25 m antenna, operated by Xinjiang Astronomical Observatory, CAS, for our formaldehyde observations. The $\text{H}_{110\alpha}$ RRLs at 4874.1570 MHz and the H_2CO absorption lines at 4829.6594 MHz are observed simultaneously. At this frequency the half power width of the main beam is about $10''$. A Digital Filter Bank spectrometer with 8192 channels is used, which results in a velocity resolution of 0.13km s^{-1} . The pointing and tracking accuracy is better than $20''$, and the beam efficiency is 0.65. The system temperature is about 23K. DPFU (Degrees Per Flux Unit) is $0.116\text{K}/Jy$.

3. Results and Summary

1) more than 200 new formaldehyde sources are detected for the first time.

2) 8 extended star formation regions are mapped with H_2CO absorption lines and $\text{H}_{110\alpha}$ RRLs. All the regions show that the formaldehyde distribution is similar to the large scale CO but has less correlation at small scales. Meanwhile, the distribution of H_2CO also reveals a distribution similar to a $8.28\mu\text{m}$ MSX color map and CBT at 4.8GHz.

3) We resolve the kinematic distance ambiguities for 14 HII regions and 20 intervening molecular clouds. These numbers suggest that UCHII regions are tightly confined to the Galactic plane. There is a good statistical relationship between the fluxes of H_2CO and infrared $100\mu\text{m}$ for those HII regions with two lines detected. This suggests that there is a weak correlation between the continuum fluxes at 6cm and infrared $100\mu\text{m}$.

Reference

Townes C. H. & Cheung A. C., 1969, *ApJ*, 157, L103