have not yet made a sufficiently careful study of the internal motions within each H II region to give a clear answer regarding the dispersion of the ensemble.

PUDRITZ: Have low luminosity infrared sources been found or searched for in your proposed ring structure?

WELCH: There is one strong 20 μ peak near the bipolar and H_2O maser source. Otherwise, there is a smooth background of 20 μ emission over the "ring" in which the individual H II regions do not appear as point sources. This is consistent with a large dust extinction in front of and within the region.

$^{12}C^{18}O$ IN OMC-1: KINEMATICS, MOLECULAR COLUMN DENSITY, AND KINETIC TEMPERATURE DISTRIBUTION

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A fully sampled map of size ∿1'×3' (R.A. Dec.), centered on BN-KL has been made in the J = 1-0 line of $^{12}C^{18}O$ with 21" angular resolution. The $^{12}C^{18}O$ emission is concentrated in a ≦ 40" wide continuous strip running S to NE. Several maxima are superposed on the ridge, but none exceeds the average emission level by more than 40%. There is no intense peak of $^{12}C^{18}O$ J = 1-0 line emission centered on BN-KL, in contrast to maps of the dust emission. The dust and $^{12}C^{18}O$ results can be reconciled with a constant (CO/H_2) ratio if there are variations in the kinetic temperature and column density of ∿50%. Peaks in both temperature and column density are then located near BN-KL, and 90" to the south. From the estimated CO column density, about 10% of the carbon is in the form of CO. Near the BN-KL region, the $^{12}C^{18}O$ line profiles tend to become wider. These wider lines appear to be superposed on a weak, 18 km s^{-1} (FWHP) wide pedestal. In regions 40" NE and 30" S of BN-KL, the $^{12}C^{18}O$ lines have widths of less than 2 km s^{-1}. Presumably, these are the locations of high density, quiescent molecular gas. The radial velocity of the CO emission increases from 6.5 km s^{-1} (at 90" S) to 10.5 km s^{-1} (at 60" NE) of BN-KL. Close to BN-KL, however, there is evidence that this trend is reversed.

HASEGAWA: What is the typical optical depth of the $C^{18}O$ line? It is possible that the small-scale clumps which are optically thick in the $C^{18}O$ line cause the different appearance of the $C^{18}O$ and 400 μm maps?

WILSON: For example, in BN-KL, the beam dilution in the "Hot Component" would raise the peak line temperature by a factor of 4, to 10 K. Thus, $\tau(^{12}C^{18}O)$ would be about 0.1 in this line and optical depth effects would not be very important.

IMAGES OF STAR FORMING REGIONS IN CO AND H_2

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A collaboration between Nobeyama Radio Observatory and UKIRT has produced high resolution images in CO and H_2 of the star forming regions DR21, Orion, and M17. In each case the images in the two species are remarkably similar. This is a striking result, for the H_2 traces a very hot component of the interstellar medium, either shocked to temperatures around 2000 K or highly excited by ultraviolet fluorescence.

The velocity resolution of the CO data is ample to demonstrate the morphology and dynamics of the violent interaction between these H II regions and their parent molecular clouds. DR21 shows a large jet-like structure, the prominent ionization fronts of the Orion Nebula drive conspicuous shocks, and M17 has the expanding shell structure expected of a blister H II region.

RELATION BETWEEN PHYSICAL ENVIRONMENT AND ITS CHEMISTRY IN ORION KL

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1. INTRODUCTION

Orion KL is a famous high-mass star forming region, and many investigations have studied its dynamical aspects. But the chemical aspects of Orion KL are still veiled. In this paper, from chemical and physical analysis, we show that there are differences in the chemistry among many "velocity elements" in the core of Orion KL.

2. OBSERVATIONS AND DATA

The observations were made using the 45-m telescope of Nobeyama Radio