OBSERVATIONS OF HNO

L. E. Snyder[1], J. M. Hollis[2], L. M. Ziurys[3], and Y.-J. Kuan[1]

[1]Astronomy Dept., Univ. of Illinois; [2]Space Data & Computing Div., NASA/GSFC; [3]Chemistry Dept., Arizona State Univ.

ABSTRACT. Interferometric observations of the HNO 3.68 mm line in Sgr B2 show clumping and some distribution similarities with HNCO. A search for the HNO 1.23 mm line with the NRAO 12-m telescope was unsuccessful.

1. Introduction and Observations

HNO studies are important because some compounds with the N-O bond appear to be underabundant compared to ion-molecule predictions, and the exact location of N compounds in cloud clumps is not well known. The identification of interstellar HNO was confirmed recently by FCRAO and BIMA array observations (Hollis et al. 1991; Snyder et al. 1991). New BIMA array maps of the HNO 1_{01}-0_{00} line at 81,477.56 MHz (3.68 mm) around Sgr B2 are presented here (Figs. 1 and 2); these new maps used 20 baselines (5 configurations in B-array and 3 in C-array).

In addition, the NRAO 12-m telescope equipped with a DSB SIS receiver was used to search Sgr B2(M) for the HNO 3_{03}- 2_{02} line at 244,364.09 MHz (1.23 mm). These observations were conducted in March and April, 1991.

2. Results and Conclusions

At 3.68 mm, 5 HNO emission clumps and 1 absorption source (Sgr B2(M)) were detected with the BIMA array. We note that HNO observations with a 6-m BIMA single antenna (2′ HPBW) show that the emission peaks at 69 km/s in Sgr B2(M), but 30" south in Sgr B2(OH) it peaks at 64 km/s. This suggests that a typical single-dish Sgr B2(M) HNO spectrum (not shown) is dominated by clumps with higher velocity than those near Sgr B2(OH). The main HNO features generally agree with BIMA maps of the HNCO 4_{04}-3_{03} line at 87,925.24 MHz near 68 km/s, but the HNCO is much stronger.

The HNO 3_{03}-2_{02} line was not detected in Sgr B2(M), with an upper limit of $T_A^* < 0.05$ K (3σ). Because this limit is comparable to the HNO intensities at lower frequencies, it suggests weak excitation.

Support came from NASA PO S-46462-E, and the Laboratory for Astronomical Imaging with funds from the University of Illinois and NSF AST 90-24603.

P. D. Singh (ed.), Astrochemistry of Cosmic Phenomena, 187–188.
© 1992 *IAU. Printed in the Netherlands.*

https://doi.org/10.1017/S007418090008997X Published online by Cambridge University Press

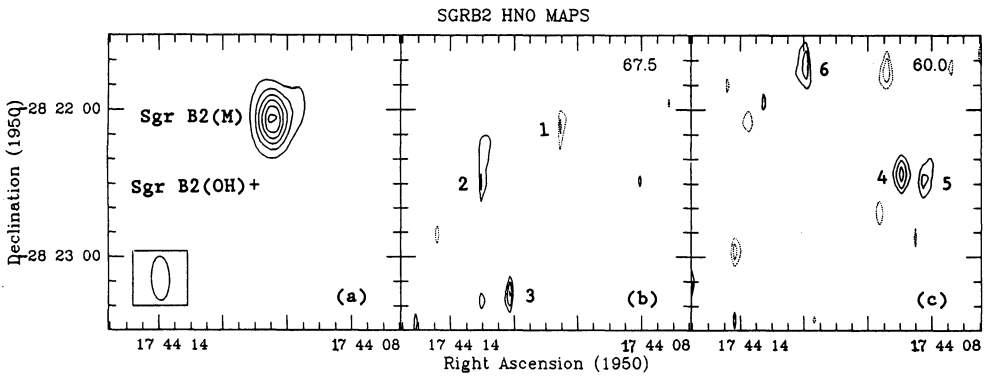

Figure 1. (a) Sgr B2(M) 3.68 mm continuum. Contour intervals: 1.0 Jy/bm. Peak = 6.11 Jy/bm. The inset shows the 17".95 x 7".41 beam. (b) HNO at 67.5 km/s (averaged over 10 km/s intervals). Contour intervals: -0.25, -0.30 (dots); and 0.25, 0.30, 0.35 Jy/bm (solid). Peak = 0.36 Jy/bm. (c) HNO at 60.0 km/s (averaged over 7 km/s intervals). Contour intervals: -0.3, -0.4 (dots); and 0.3, 0.4, 0.5 Jy/bm (solid). Peak = 0.56 Jy/bm.

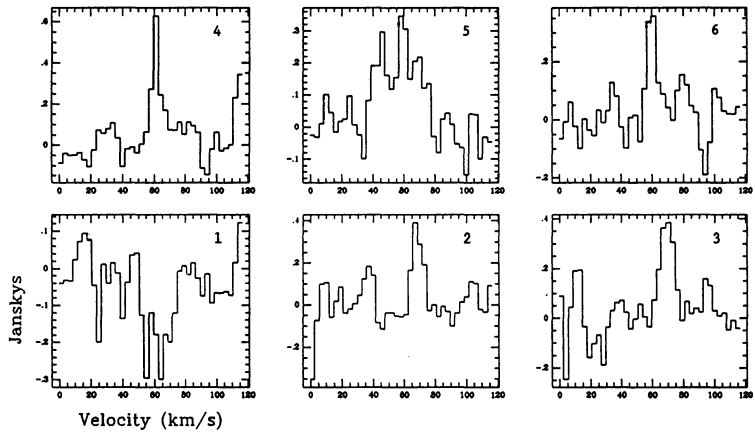

Figure 2. Spectra of the HNO 3.68 mm line constructed from data cubes corresponding to numbered clumps in Figure 1. Abscissa: LSR radial velocity (km/s). Ordinate: intensity (Jy/beam).

5. References

Hollis, J. M., Snyder, L. E., Ziurys, L. M., and McGonagle, D. (1991) 'Interstellar HNO:confirming the identification', in A. D. Haschick and P. T. P. Ho (eds), Skylines, ASP Conference Series 16, San Francisco, pp. 407-12.

Snyder, L.E., Kuan, Y.-J., and Pratap, P. (1991) 'Millimeter wavelength molecular maps of the clumped gas around Sgr B2(OH)', Ibid., pp. 191-6.

https://doi.org/10.1017/S007418090008997X Published online by Cambridge University Press