DETECTION OF NEW AMMONIA SOURCES

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Ammonia is a favoured molecule for the study of molecular clouds since several important parameters of the cloud can be deduced from simple observations of the J,K=1,1 and 2,2 inversion doublet transitions and the hyperfine structure in the (1,1) line. With the additional knowledge of the kinetic temperature T_k from observations of CO, for example, it is possible to compute the excitation temperature of the (1,1) line (T_{11}), the rotational temperature between the (1,1) and (2,2) levels (T_{21}), the molecular hydrogen density $n(H_2)$ and ammonia column density $N(NH_3)$ (see, for example, Martin and Barrett, 1978).

We have undertaken a systematic survey of compact HII regions, H_2O masers, Herbig-Haro objects and other protostellar indicators for emission in the (1,1) and (2,2) transitions of NH_3, using the SRC Appleton Laboratory 25 m telescope (η_B=0.37). So far this program has yielded 33 detections which we report here. 5 of these sources were detected independently by Ho (1977) but not published elsewhere, and are included here for completeness.

The objects to be searched were selected from the following lists:

(i) Compact HII regions (Felli et al., 1978, Israel and Felli, 1978);
(ii) H_2O masers (Genzel and Downes, 1977, 1979);
(iii) Herbig-Haro objects (Gyulbudaghian et al., 1978);
(iv) Peaks in HCN emission (Tucker, private communication);
(v) Reflection nebulae (Knapp et al., 1977);
(vi) CO 'hot spots' (Blair et al., 1975).

The 33 new NH_3 sources are listed in Table 1, which gives the antenna temperatures in each transition $T_A(1,1)$, $T_A(2,2)$, the antenna temperature of the hyperfine structure of the (1,1) line $T_{HFS}(1,1)$, the velocity V_{LSR} and the width ΔV_{LSR} of the main component of the (1,1) line.

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Table 1. Observational parameters of the (1,1) and (2,2) lines of NH_3 detected in present survey.

SOURCE	α(1950)	δ(1950)	$T_A(1,1)$ (K)	$T_{HFS}(1,1)$ (K)	V_{LSR} (kms^{-1})	ΔV_{LSR} (kms^{-1})	$T_A(2,2)$ (K)
S187	01 20 24	61 38 25	0.15	- ±0.014	-15.1	1.8	0.03
N2-3	03 25 45	30 56 00	0.38	0.1±0.04	7.2	1.1	0.05
N4	05 37 22	23 49 24	0.28	0.16±0.04	2.3	1.9	0.14
S235	05 37 30	35 40 00	0.22	0.11±0.06	-17.0	2.0	-
N7	05 38 24	-8 09 00	0.32	0.16±0.06	5.6	1.3	0.06
G205.11-14.11	05 44 31	00 20 48	0.70	0.22±0.03	8.85	1.7	0.26
Mon R2	06 05 19	-6 22 40	0.46	0.21±0.024	10.3	2.6	0.19
N12-15	06 08 28	-6 10 46	0.35	0.13±0.05	11.7	1.4	0.07
S255	06 10 01	18 01 30	0.25	0.15±0.10	7.0	3.0	-
N16-17	06 10 21	-6 13 00	0.24	0.09±0.05	11.7	1.9	0.18
Rosette IRS	06 31 57	4 15 03	0.22	- ±0.017	12.6	1.3	0.12
S68	18 27 28	1 12 00	0.77	0.30	7.8	1.8	0.22
G23.95+0.15	18 31 41	-7 57 17	0.22	0.12±0.021	80.6	2.1	0.09
G24.49-0.04	18 33 23	-7 33 54	0.24	0.09±0.03	109.6	2.6	0.18
G24.8+0.1	18 33 30	-7 14 27	0.61	0.185±0.028	110.2	3.2	0.31
G28.86+0.07	18 41 8	-3 38 41	0.17	<0.04	99.8	1.9	<0.03
W43S	18 43 27	-2 42 40	0.26	0.09±0.016	97.6	3.2	0.26
G31.4-0.3	18 44 59	-1 16 07	0.26	0.08±0.03	96.2	2.3	0.07
G32.15+0.13	18 46 58	-0 41 30	0.19	≤0.09	94.7	2.1	0.15
G33.9+0.1	18 50 16	0 51 47	0.18	0.07±0.018	107.0	2.6	0.15
G34.3+0.1	18 50 46	1 11 00	0.59	0.18±0.024	58.1	2.8	0.40
W48	18 59 15	1 08 50	0.24	0.17±0.019	42.6	1.9	0.22
G45.49+0.13	19 11 50	11 7 47	0.22	<0.04	59.3	1.9	0.13
S87	19 44 14	24 27 58	0.31	0.1±0.03	24.1	1.7	0.19
S88	19 44 44	25 05 30	0.22	0.01±0.016	21.8	2.1	0.13
ON1	20 08 10	31 22 41	0.67	0.24±0.020	11.0	2.5	0.22
ON2	20 19 50	37 16 30	0.28	0.08±0.021	-0.3	3.0	0.14
R131	20 22 41	42 06 18	0.37	0.15±0.05	5.0	1.7	0.12
S106	20 25 27	37 12 45	0.50	0.24±0.015	1.5	1.7	0.24
R146	21 42 40	65 52 57	0.18	0.08±0.04	-9.8	0.9	0.13
S140	22 17 45	63 04 00	0.69	0.27±0.015	-7.1	1.8	0.38
Cep A	22 54 20	61 45 42	0.29	0.13±0.05	-11.1	3.5	0.22
S156A	23 03 05	59 58 10	0.23	0.12±0.08	-51	3.2	-

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