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**PAPS. Document**  
**Microwave spectrum and molecular structure of the**  
**H<sub>2</sub>NS radical**

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Five pages

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PAPS 1. Transition frequencies of the H<sub>2</sub>NS radical observed with the source-modulation spectrometer<sup>a</sup>

$N_{K-1K+1}$	$J$	$F_1^b$	$\nu_{obs}$ [MHz]	$\Delta\nu^c$ [MHz]
5 <sub>05</sub> -4 <sub>04</sub>	11/2- 9/2		157383.342	0.028
5 <sub>15</sub> -4 <sub>14</sub>	9/2- 7/2		154270.283	0.024
5 <sub>15</sub> -4 <sub>14</sub>	11/2- 9/2	9/2- 7/2	156477.339	0.010
5 <sub>15</sub> -4 <sub>14</sub>	11/2- 9/2	11/2- 9/2	156478.421	0.035 <sup>d</sup>
5 <sub>15</sub> -4 <sub>14</sub>	11/2- 9/2	13/2- 11/2	156478.421	0.035 <sup>d</sup>
5 <sub>14</sub> -4 <sub>13</sub>	9/2- 7/2	7/2- 5/2	158051.196	-0.018
5 <sub>14</sub> -4 <sub>13</sub>	9/2- 7/2	9/2- 7/2	158050.116	-0.021
5 <sub>14</sub> -4 <sub>13</sub>	9/2- 7/2	11/2- 9/2	158049.002	0.047
5 <sub>14</sub> -4 <sub>13</sub>	11/2- 9/2		160157.005	0.016
5 <sub>33</sub> -4 <sub>32</sub>	11/2- 9/2	9/2- 7/2	162367.140	0.005
5 <sub>33</sub> -4 <sub>32</sub>	11/2- 9/2	11/2- 9/2	162368.826	-0.007
5 <sub>33</sub> -4 <sub>32</sub>	11/2- 9/2	13/2- 11/2	162369.748	-0.006
6 <sub>06</sub> -5 <sub>05</sub>	13/2- 11/2		188849.085	0.001
6 <sub>16</sub> -5 <sub>15</sub>	11/2- 9/2		185775.429	0.018
6 <sub>16</sub> -5 <sub>15</sub>	13/2- 11/2	11/2- 9/2	187334.962	-0.046
6 <sub>16</sub> -5 <sub>15</sub>	13/2- 11/2	13/2- 11/2	187335.763	0.018 <sup>d</sup>
6 <sub>16</sub> -5 <sub>15</sub>	13/2- 11/2	15/2- 13/2	187335.763	0.018 <sup>d</sup>
6 <sub>15</sub> -5 <sub>14</sub>	11/2- 9/2	9/2- 7/2	190309.770	0.032
6 <sub>15</sub> -5 <sub>14</sub>	11/2- 9/2	11/2- 9/2	190309.023	0.012
6 <sub>15</sub> -5 <sub>14</sub>	11/2- 9/2	13/2- 11/2	190308.275	0.001
6 <sub>15</sub> -5 <sub>14</sub>	13/2- 11/2		191765.688	0.005
6 <sub>25</sub> -5 <sub>24</sub>	11/2- 9/2	9/2- 7/2	186008.746	0.002
6 <sub>25</sub> -5 <sub>24</sub>	11/2- 9/2	11/2- 9/2	186007.752	-0.005
6 <sub>25</sub> -5 <sub>24</sub>	11/2- 9/2	13/2- 11/2	186006.735	-0.030
6 <sub>24</sub> -5 <sub>23</sub>	11/2- 9/2	9/2- 7/2	186054.862	-0.003
6 <sub>24</sub> -5 <sub>23</sub>	11/2- 9/2	11/2- 9/2	186053.916	-0.007

(Continued)

$N_{K-1K+1}$	$J$	$F_1^b$	$\nu_{obs}$ [MHz]	$\Delta\nu^c$ [MHz]
6 <sub>24</sub> -5 <sub>23</sub>	11/2- 9/2	13/2- 11/2	186052.966	-0.023
6 <sub>34</sub> -5 <sub>33</sub>	11/2- 9/2	9/2- 7/2	183920.766	0.021
6 <sub>34</sub> -5 <sub>33</sub>	11/2- 9/2	11/2- 9/2	183919.610	-0.004
6 <sub>34</sub> -5 <sub>33</sub>	11/2- 9/2	13/2- 11/2	183918.085	-0.003
6 <sub>34</sub> -5 <sub>33</sub>	13/2- 11/2	11/2- 9/2	192920.437	0.041
6 <sub>34</sub> -5 <sub>33</sub>	13/2- 11/2	13/2- 11/2	192921.596	-0.015
6 <sub>34</sub> -5 <sub>33</sub>	13/2- 11/2	15/2- 13/2	192922.335	0.012
7 <sub>07</sub> -6 <sub>06</sub>	15/2- 13/2		220304.246	-0.006
7 <sub>17</sub> -6 <sub>16</sub>	13/2- 11/2		217120.889	0.016
7 <sub>16</sub> -6 <sub>15</sub>	13/2- 11/2	11/2- 9/2	222405.759	0.035
7 <sub>16</sub> -6 <sub>15</sub>	15/2- 13/2		223454.640	-0.006
7 <sub>3</sub> -6 <sub>3</sub>	15/2- 13/2	13/2- 11/2	223678.886	-0.061 <sup>e</sup>
8 <sub>08</sub> -7 <sub>07</sub>	15/2- 13/2		251828.076	0.005
8 <sub>08</sub> -7 <sub>07</sub>	17/2- 15/2		251747.043	0.000
8 <sub>18</sub> -7 <sub>17</sub>	15/2- 13/2		248375.815	0.017
8 <sub>18</sub> -7 <sub>17</sub>	17/2- 15/2		249260.123	0.024
8 <sub>17</sub> -7 <sub>16</sub>	17/2- 15/2		255188.070	0.002
9 <sub>09</sub> -8 <sub>08</sub>	17/2- 15/2		283255.504	-0.009
9 <sub>09</sub> -8 <sub>08</sub>	19/2- 17/2		283175.683	-0.004
9 <sub>19</sub> -8 <sub>18</sub>	17/2- 15/2		279574.430	-0.006
9 <sub>19</sub> -8 <sub>18</sub>	19/2- 17/2		280270.845	-0.031
9 <sub>18</sub> -8 <sub>17</sub>	17/2- 15/2		286355.477	-0.016
9 <sub>18</sub> -8 <sub>17</sub>	19/2- 17/2		286946.243	-0.010
9 <sub>3</sub> -8 <sub>3</sub>	19/2- 17/2		285624.064	0.028 <sup>e</sup>

<sup>a</sup>Hyperfine structure of the H nuclei is not resolved.

<sup>b</sup>Transitions without specification of  $F_1$  show no hyperfine splittings due to the N nucleus, and their frequencies are compared with the weighted average over the three hyperfine component frequencies. See text.

<sup>c</sup>Residual in the least-squares fit;  $\Delta\nu = \nu_{obs} - \nu_{calc}$

<sup>d</sup>These transitions are not split. Their frequencies are compared with the weighted average over the two hyperfine component frequencies.

<sup>e</sup>Unresolved  $K$ -type doublet. The frequencies are compared with the averaged value for the two  $K$ -type doublet line frequencies.

PAPS 2. Transition frequencies of the D<sub>2</sub>NS radical observed with the source-modulation spectrometer<sup>a</sup>

$N_{K-1K+1}$	$J$	$\nu_{obs}$ [MHz]	$\Delta\nu^b$ [MHz]
9 <sub>09</sub> - 8 <sub>08</sub>	19/2- 17/2	241128.535	0.003
9 <sub>19</sub> - 8 <sub>18</sub>	17/2- 15/2	236662.676	0.015
9 <sub>19</sub> - 8 <sub>18</sub>	19/2- 17/2	236947.199	-0.051
9 <sub>18</sub> - 8 <sub>17</sub>	19/2- 17/2	246587.205	0.019
9 <sub>28</sub> - 8 <sub>27</sub>	19/2- 17/2	242210.164	-0.036
9 <sub>27</sub> - 8 <sub>26</sub>	17/2- 15/2	241765.558	-0.027
9 <sub>27</sub> - 8 <sub>26</sub>	19/2- 17/2	242871.594	-0.027
10 <sub>010</sub> - 9 <sub>09</sub>	19/2- 17/2	267798.155	-0.017
10 <sub>110</sub> - 9 <sub>19</sub>	19/2- 17/2	262958.999	0.041
10 <sub>19</sub> - 9 <sub>18</sub>	21/2- 19/2	273894.591	0.002
10 <sub>29</sub> - 9 <sub>28</sub>	21/2- 19/2	268936.703	-0.067
10 <sub>28</sub> - 9 <sub>27</sub>	19/2- 17/2	268956.679	-0.003
10 <sub>28</sub> - 9 <sub>27</sub>	21/2- 19/2	269845.543	-0.031
10 <sub>38</sub> - 9 <sub>37</sub>	19/2- 17/2	267679.184	0.028
10 <sub>38</sub> - 9 <sub>37</sub>	21/2- 19/2	269654.053	0.008
11 <sub>011</sub> - 10 <sub>010</sub>	21/2- 19/2	294349.839	-0.012
11 <sub>011</sub> - 10 <sub>010</sub>	23/2- 21/2	294295.257	0.021
11 <sub>111</sub> - 10 <sub>110</sub>	21/2- 19/2	289230.741	-0.007
11 <sub>111</sub> - 10 <sub>110</sub>	23/2- 21/2	289413.598	0.005
11 <sub>110</sub> - 10 <sub>19</sub>	21/2- 19/2	301096.396	0.018
11 <sub>110</sub> - 10 <sub>19</sub>	23/2- 21/2	301189.206	-0.018
11 <sub>210</sub> - 10 <sub>29</sub>	21/2- 19/2	294928.524	0.000
11 <sub>210</sub> - 10 <sub>29</sub>	23/2- 21/2	295672.912	0.027
11 <sub>29</sub> - 10 <sub>28</sub>	21/2- 19/2	296157.629	-0.012
11 <sub>39</sub> - 10 <sub>38</sub>	21/2- 19/2	294748.618	0.037
11 <sub>39</sub> - 10 <sub>38</sub>	23/2- 21/2	296399.272	0.023
11 <sub>38</sub> - 10 <sub>37</sub>	21/2- 19/2	294772.045	-0.054
11 <sub>38</sub> - 10 <sub>37</sub>	23/2- 21/2	296422.205	-0.020
11 <sub>4</sub> - 10 <sub>4</sub>	21/2- 19/2	294034.784	-0.044 <sup>c</sup>
11 <sub>4</sub> - 10 <sub>4</sub>	23/2- 21/2	296817.310	0.016 <sup>c</sup>

(Continued)

$N_{K_{-1}K_{+1}}$	$J$	$\nu_{obs}$ [MHz]	$\Delta\nu^b$ [MHz]
13 <sub>113</sub> - 12 <sub>112</sub>	25/2- 23/2	341706.877	0.001
13 <sub>113</sub> - 12 <sub>112</sub>	27/2- 25/2	341831.630	-0.011
13 <sub>112</sub> - 12 <sub>111</sub>	25/2- 23/2	355689.203	0.023
13 <sub>112</sub> - 12 <sub>111</sub>	27/2- 25/2	355724.327	-0.030
13 <sub>212</sub> - 12 <sub>211</sub>	25/2- 23/2	348621.170	-0.012
13 <sub>212</sub> - 12 <sub>211</sub>	27/2- 25/2	349146.280	0.007
13 <sub>211</sub> - 12 <sub>210</sub>	25/2- 23/2	350634.960	-0.018
13 <sub>211</sub> - 12 <sub>210</sub>	27/2- 25/2	351131.393	0.003
13 <sub>311</sub> - 12 <sub>310</sub>	25/2- 23/2	348784.889	0.005
13 <sub>311</sub> - 12 <sub>310</sub>	27/2- 25/2	349977.437	-0.037
13 <sub>310</sub> - 12 <sub>309</sub>	25/2- 23/2	348839.644	-0.039
13 <sub>4</sub> - 12 <sub>4</sub>	25/2- 23/2	348173.095	-0.042 <sup>c</sup>
13 <sub>4</sub> - 12 <sub>4</sub>	27/2- 25/2	350235.074	-0.039 <sup>c</sup>
13 <sub>5</sub> - 12 <sub>5</sub>	25/2- 23/2	347523.397	0.034 <sup>c</sup>
13 <sub>5</sub> - 12 <sub>5</sub>	27/2- 25/2	350582.016	0.011 <sup>c</sup>
14 <sub>014</sub> - 13 <sub>013</sub>	27/2- 25/2	373621.711	-0.039
14 <sub>014</sub> - 13 <sub>013</sub>	29/2- 27/2	373580.272	0.043
14 <sub>114</sub> - 13 <sub>113</sub>	27/2- 25/2	367912.168	0.007
14 <sub>114</sub> - 13 <sub>113</sub>	29/2- 27/2	368016.968	0.003
14 <sub>113</sub> - 13 <sub>112</sub>	27/2- 25/2	382942.548	0.023
14 <sub>113</sub> - 13 <sub>112</sub>	29/2- 27/2	382958.026	-0.025
14 <sub>213</sub> - 13 <sub>212</sub>	27/2- 25/2	375425.044	0.001
14 <sub>213</sub> - 13 <sub>212</sub>	29/2- 27/2	375874.375	0.040
14 <sub>212</sub> - 13 <sub>211</sub>	29/2- 27/2	378340.609	0.066
14 <sub>312</sub> - 13 <sub>311</sub>	27/2- 25/2	375769.398	0.008
14 <sub>5</sub> - 13 <sub>5</sub>	27/2- 25/2	374577.120	0.026 <sup>c</sup>
14 <sub>5</sub> - 13 <sub>5</sub>	29/2- 27/2	377267.276	0.015 <sup>c</sup>

<sup>a</sup>Hyperfine structure of the D nuclei and the N nucleus is not resolved.

<sup>b</sup>Residual in the least-squares fit;  $\Delta\nu = \nu_{obs} - \nu_{calc}$

<sup>c</sup>Unresolved  $K$ -type doublet. The frequencies are compared with the averaged value for the two  $K$ -type doublet line frequencies.