FAR-INFRARED LASER MAGNETIC RESONANCE SPECTROSCOPY OF VIBRATIONALLY EXCITED NH

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The laser magnetic resonance (LMR) spectroscopic technique has been used to investigate the rotational spectrum of the NH radical in its $^3\Sigma^-$ ground electronic state. An optically pumped molecular laser was used as a source of radiation in the 26.7683 to 123.3066 cm^{-1} region of the far-infrared. The molecular transitions were brought into resonance with the laser frequency using magnetic fields up to 2 T. Using twenty-seven laser lines, spectra were recorded in both parallel ($\Delta M_J = 0$) and perpendicular ($\Delta M_J = \pm 1$) polarizations. Observation of the $N' \leftarrow N'' = 1 \leftarrow 0$, $2 \leftarrow 1$, $3 \leftarrow 2$ and $4 \leftarrow 3$ transitions in the first and second excited vibrational levels of NH allows its molecular parameters (particularly the hyperfine constants) to be refined.

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