ROTATIONAL SPECTRUM OF CIS-CIS HOONO

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The pure rotational spectrum of *cis-cis* peroxynitrous acid, HOONO, has been observed for the first time. Over 220 transitions, sampling states up to $J' = 67$ and $K'_a = 31$, have been fitted with an RMS uncertainty of 48.4 kHz. The experimentally determined rotational constants agree well with $ab\,initio$ values for the *cis-cis* conformer, a five-membered ring formed by intramolecular hydrogen bonding. The small, positive inertial defect, Δ = 0.075667(60) amu Å^2, and lack of any observable torsional splittings in the spectrum indicate that *cis-cis* HOONO exists in a well-defined planar structure at room temperature. Analysis of the rotational spectrum of the deuterated isotopologue, DOONO, confirms the planar molecular structure and yields substitution coordinates for the hydrogen atom.