LINE STRENGTH MEASUREMENTS IN THE $\nu_2$ BAND OF H$_2^{18}$O

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Spectra of an H$_2^{18}$O enriched sample of water vapor were recorded from 1780 to 4500 cm$^{-1}$, at room temperature, with a Bruker IFS-125 instrument and a liquid nitrogen cooled InSb detector. A single path, 24 cm long, glass cell with ZnSe windows was filled with H$_2^{18}$O water vapor at 97.1% purity from CDN Isotopes. For the various spectra, pressures ranging from 4.3 to 18.4 Torr were measured with two different MKS Baratron gauges having 10 and 100 Torr pressure limits. The unapodized spectral resolution was 0.002 cm$^{-1}$. Line strengths were retrieved from these spectra for transitions belonging to the $\nu_2$ band with the help of a computer program determining simultaneously line positions, strengths, and linewidths by nonlinear least-squares fitting. The new line strength values were analyzed with those already available for rotational transitions within the ground vibrational state$^a$ and for $\nu_2$ band$^b$ transitions. In order to account for the anomalous centrifugal distortion displayed by water, this line intensity analysis was performed using the Bending-Rotation Hamiltonian approach.$^c$

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