LINE POSITIONS AND INTENSITIES OF PHOSPHINE IN THE 3 μm REGION FOR PLANETARY APPLICATIONS

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Seven absorption bands of PH_3 at 3 μm, i.e $3\nu_2$, $2\nu_2 + \nu_4$, $2\nu_4 + \nu_2$, $\nu_1 + \nu_2$, $\nu_3 + \nu_2$, $\nu_3 + \nu_4$ and $\nu_1 + \nu_4$ were simultaneously analysed from spectra recorded at a resolution of 0.012 cm^{-1} using the Fourier transform spectrometer located at the Kitt Peak Observatory[a]. A theoretical model suited to the strong vibro-rotational couplings among the seven bands was used. Using ground state combination differences, several hundred transitions have been assigned for these seven bands in the range 2750–3600 cm^{-1}. At present a set of 33 energy parameters was required to reproduce the experimental wavenumbers for six bands with an overall standard deviation of 0.1 cm^{-1} up to $J = 9$. 1355 lines were also measured and their analysis is underway. The final objective is to provide a complete prediction of line positions and intensities of Phosphine at 3 μm for remote sensing of Saturn.

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