ROVIBRATIONAL CHARACTERIZATION OF $X^2\Sigma^+$ $^{11}BH^+$ BY THE EXTRAPOLATION OF PHOTOSELECTED HIGH-RYDBERG SERIES IN ^{11}BH

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Optical-optical-optical triple resonance spectroscopy of ^{11}BH isolates high-Rydberg states that form series converging to rotational state specific ionization potentials in the vibrational levels of $^{11}BH^+$ from $v^+ = 0$ through 4. Limits defined by a comprehensive fit of these series to state-detailed thresholds yield rovibrational constants describing the $X^2\Sigma^+$ state of $^{11}BH^+$. The data provide a first determination of the vibration-rotation interaction parameter $\alpha_e = 0.4821$ cm^{-1} and a more accurate estimate of $\omega_e = 2526.58$ cm^{-1} together with the higher-order anharmonic terms $\omega_e x_e = 61.98$ cm^{-1} and $\omega_e y_e = -1.989$ cm^{-1}. The deperturbation and global fit of series to state-detailed limits also yields a precise value of the adiabatic ionization potential of ^{11}BH of $79120.3(1)$ cm^{-1}, or $9.81033(1)$ eV. High precision is afforded here by the use of graphical analysis techniques, narrow bandwidth laser systems, and an analysis of newly observed, high-principal quantum number Rydberg states that conform well with a Hund's case (d) electron-core coupling limit.

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