THE $\tilde{B}1/2\ (^2\Sigma^+) - \tilde{X}^2\Sigma^+$ ELECTRONIC TRANSITIONS OF LaNH AND LaND

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New high resolution spectra of the $\tilde{B}1/2\ (^2\Sigma^+) - \tilde{X}^2\Sigma^+$ transitions of LaNH and LaND, near 16000 cm^{-1}, have been obtained under jet-cooled conditions, following the reaction of laser-ablated lanthanum metal with NH_3 and ND_3. Rotational analyses have given the ground state structure as r_0(La-N) = 1.932072(11) Å; r_0(N-H) = 1.01357(31) Å. Strong vibronic and spin-orbit coupling is found to occur between the $\tilde{B}$ state and the $\tilde{A}^2\Pi$ state near 12600 cm^{-1}. This causes various interesting effects: the hyperfine line strengths in the $\tilde{B} - \tilde{X}$ transition are unusual, showing that, though it is nominally $^2\Sigma - {}^2\Sigma$, both parallel and perpendicular transition moments are present; also the bending frequency of the $\tilde{B}$ state is raised by 150 cm^{-1} compared to the ground state, while its vibrational structure shows large l-dependent "spin-vibration" splittings which can be represented by $A_{sv}\, l$, where $A_{sv} \simeq -14$ cm^{-1}.