OBSERVATION OF $\Omega = 1/2$ STATES IN NiH THROUGH COLLISIONALLY INDUCED FLUORESCENCE

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Fourier transform spectra of collisionally induced fluorescence following isotopically selective laser excitation of NiH at ~ 550 nm has allowed us to locate an exited $\Omega' = 1/2$ state of NiH lying 17900 cm^{-1} above the electronic ground state. We identify this as $v = 0$ of a $^2\Pi_{1/2}$ state, originating from the Ni$^+$ $3d^8 4s^1$ ^{2}F configuration, from the ab initio studies published by Zou and Liu in 2007[b]. Emission from the [17.9]0.5 state occurs to $v'' = 0$ and 1 of the $^2\Sigma^+$ and $^2\Pi_{1/2}$ low-lying ligand field states, locating hitherto elusive $^2\Pi_{1/2}$ f parity levels to within 0.01 cm^{-1}.

Collisionally induced fluorescence following laser excitation at lower energies has been recorded in the presence of a magnetic field ($0.7 - 1$ Tesla), at Doppler resolution. The partially resolved Zeeman patterns have been used to derive effective Landé factors g_J for the $v = 0$ and 1 levels of the low-lying $\Omega'' = 5/2$ and $3/2$ states ($^2\Delta$ and $^2\Pi$ states from Ni$^+$ $3d^9$). These are compared with predictions from a revised fit of zero-field energy levels, now including the new observations concerning the $\Omega'' = 1/2$ states.

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