THE $X\,^2\Pi_i$, $A\,^2\Delta_i$ AND $B\,^2\Sigma^+$ LOW-LYING STATES OF NiCl : LASER INDUCED AND FOURIER TRANSFORM EXPERIMENTS

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The $X\,^2\Pi_{3/2}$, $A\,^2\Delta_{5/2}$ (161 cm^{-1}) and $B\,^2\Sigma^+$ (1,768 cm^{-1}) low-lying states of NiCl have been recently identified. Transitions linking these states to upper $[21.9]\,^2\Delta_{5/2}$, $[24.5]\,^2\Pi_{3/2}$ and $[24.9]\,^2\Pi_{1/2}$ states have been rotationally analyzed. Laser induced fluorescence experiments allowed the identification of the $X\,^2\Pi_{1/2}$ (382 cm^{-1}) and $A\,^2\Delta_{3/2}$ (1,646 cm^{-1}) spin-orbit components. All the low-lying states of NiCl associated with the nickel $3d$ atomic orbital are now observed. In addition we identified a new electronic state located at 21,608 cm^{-1}. This state is linked to all the five spin-orbit components of the X, A and B states. High resolution Fourier transform experiments made possible the analysis of three of these transitions. Laser induced dispersed fluorescence suggest that this state is also linked to a new low-lying state (1,378 cm^{-1}) which could be a component of a quartet state of NiCl.