HIGH RESOLUTION LASER SPECTROSCOPY OF THE $[20.7]^3\Phi_4$ - $X^3\Phi_4$ AND $[21.3]^3\Phi_4$ - $X^3\Phi_4$ SYSTEMS OF COBALT MONOCHLORIDE.

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Low and high resolution spectra of cobalt monochloride have been observed in the 455 - 485 nm region using a laser ablation/molecular beam spectrometer. The CoCl molecules were produced by laser vaporization of a Co rod followed by reaction with CCl_4 inside a pulsed supersonic jet source. A number of bands were seen allowing vibrational assignments to be made to transitions between the ground state and two excited electronic states with 0-0 origins near 20680.5 and 21257.3 cm^{-1}. The spectra of three vibrational bands, the 0-0 and 1-0 bands of the $[20.7]^3\Phi_4$ - $X^3\Phi_4$ transition and the 0-0 band of the $[21.3]^3\Phi_4$ - $^3\Phi_4$ transition, were recorded at high resolution with a Coherent 699-29 ring dye laser. A rotational and hyperfine analysis has been performed on these bands giving an accurate set of molecular constants for the ground and excited states. The assignment of a $^3\Phi$ state as the ground state is consistent with recent experimental and theoretical predictions for CoH and CoF.