PERTURBATION AND PREDISSOCIATION OF THE Na_2 $3^3\Pi_g$ AND $4^3\Sigma_g^+$ STATES

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The Na_2 $3^3\Pi_g$ and $4^3\Sigma_g^+$ states dissociate adiabatically to the 3s+4p atomic limit. Energy levels below the 3s+3d atomic limit of these two states have been observed by perturbation facilitated optical-optical double resonance (PFOODR) fluorescence excitation spectroscopy.[a,b]. Energy levels above the 3s+3d atomic limit could not be observed by detecting molecular fluorescence but have been observed recently by detecting atomic 3d $\rightarrow$ 3p fluorescence. The $3^3\Pi_g$ and $4^3\Sigma_g^+$ states interact with the 3s+3d $2^3\Pi_g$ and $3^3\Sigma_g^+$ states, respectively. As a result of the perturbation the $3^3\Pi_g$ state strongly predissociates and the linewidth of levels close to the 3s+3d limit is about 15cm^{-1}. The $4^3\Sigma_g^+$ state is weakly predissociated.

[a] Li Li and R. W. Field, J. Mol. Spectrosc. 117, 245 (1986).
[b] Li Li and M. Li, J. Mol. Spectrosc. 173, 25 (1996).