STUDY OF THE $A\,^1\Sigma_u^+$ AND $b\,^3\Pi_{0u}$ STATES IN Cs_2 : NEW DATA AND GLOBAL ANALYSIS

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The lowest excited states of alkali dimers are of particular interest in the creation of ultracold molecules and as pathways to higher states. Levels with mixed singlet-triplet character receive also considerable attention as window levels. The study of the $A\,^1\Sigma_u^+$ and $b\,^3\Pi_{0u^+}$ states in the heavier alkali molecules is relatively complicated due to the large spin-orbit interactions which mix the potentials of these two states.

New, low-resolution data on the $b\,^3\Pi_{0u\pm}$ states of Cs_2 have been obtained recently in Tsinghua University. These data characterize the bottom of the potential well of the b state, provide vibrational assignment and determine the value of Te, and allow us to analyze and fit previously obtained data form Lab. Aimé Cotton on mixed A/b states[a].

The complete set of observations has been modeled using the discrete variable representation. Potential energy curves have been calculated relying on *ab initio* potentials and Morse-type spin-orbit functions. Currently, the rms residual of our fit to the new data is 1.65 cm^{-1} ($\sim$ the experimental uncertainty of the dispersed fluorescence recorded on a monochromator) and 0.14 cm^{-1} to the older Fourier transform spectroscopy data which has experimental uncertainties of 0.003 cm^{-1}. Additional data would be very valuable, both in the regions where no levels have yet been observed and in those where few levels with dominant triplet character have been identified.

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[a] J. Vergès and C. Amiot, J. Mol. Spectrosc. 126 393 (1987), C. Amiot and O. Dulieu, J. Chem. Phys. 117 5155 (2002)