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Fitting an Experimental Potential Energy Curve for the $10(0^+)[4^3\Pi_0]$ Electronic State of NaCs[1] ANDREW STEELY, Department of Physics, Susquehanna University, RACHEL L. MYERS, Moravian College, ANDREW KORTYNA, National Institute of Standards and Technology, JOHN HUENNEKENS, Department of Physics, Lehigh University, R. F. MALENDA, Moravian College, CARL FAUST, Department of Physics, Susquehanna University — We present experimentally determined potential energy curves for the $10(0^+)[4^3\Pi_0]$ electronic state of NaCs. The $10(0^+)[4^3\Pi_0]$ state exhibits a double-minimum structure, resulting in a distinctive bound-free fluorescence signature. The perturbation facilitated optical-optical double resonance method was used to obtain Doppler-free excitation spectra corresponding to rovibrational redtransitions to the $10(0^+)[4^3\Pi_0]$ state. Spectroscopic constants were determined to summarize data belonging to inner well, outer well, and above the barrier regions of the electronic state. The Rydberg-Klein-Rees (RKR) and inverted perturbative approach (IPA) methods were used to construct a potential which reproduces the experimental rovibrational energies within an RMS deviation of 2.33 cm^{-1}. An alternative to the pointwise potential approach was also used to determine the potential energy curve by directly fitting an expanded Morse oscillator (EMO) functional form. Advantages of the two approaches as they apply to double minimum wells are discussed.

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