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Splitting of Λ -doubling in the transition of Hund's coupling cases in sodium molecule CHIN-CHUN TSAI, RAY-YUAN CHANG, Department of Physics, National Cheng-Kung University, Tainan, Taiwan, THOU-JEN WHANG, CHUEN-PING CHENG, Department of Chemistry, National Cheng-Kung University, Tainan, Taiwan — The phenomenon of orbital angular momentum L -uncoupling from its internuclear axis is observed in Na_2 by using high resolution cw optical-optical double resonance spectroscopy. This L -uncoupling removes the degeneracy of Λ -type doubling. In the case of Na_2 , however, such Λ -type doubling only reported in the $B^1\Pi_u$ state with large speed of rotation and without significant dependence on the vibrational quantum number v . In this study, the splitting of Λ -doubling in the $4^1\Pi_g$ and $5^1\Delta_g$ states of Na_2 is directly measured under our experimental resolution. This splitting caused by the transition of Hund's coupling from case (a) to case (d) is due to L -uncoupling from its internuclear axis. The observed energy levels with e/f parities are assigned and the Λ -type splitting constants q_0 , q_v and μ are globally fitted to a standard deviation of σ less than 0.03 cm^{-1} .

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