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Ultrasonic Study of the Yb-based Heavy Fermion Compound $\text{YbCo}_2\text{Zn}_{20}$ YOSHIKI NAKANISHI, Iwate University — We present experimental results of elastic constants as a function of temperature and magnetic field performed on a single crystal of the Yb-based heavy fermion system $\text{YbCo}_2\text{Zn}_{20}$. A marked elastic softening toward low temperature was observed in a longitudinal elastic constant C_{11} and transverse ones $(C_{11} - C_{11})/2$, C_{44} . The softening is suppressed unexpectedly in a weak applied field of 2 T. Our results strongly suggest a large degeneracy of a 4f state of the Yb ion at low temperature and the Heavy Fermion state is quenched by the applied weak field. Thus, it is expected that this highly degenerated situation due to the almost spherical CEF, realized by the unique crystal structure, would form such a heavy fermion state and a lift of the degeneracy would bring about the disappearance. We discuss these results in the context of a crystalline electric field (CEF) ground state.

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