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Raman phonon study of Jahn-Teller distortion in $Ba_3CuSb_2O_9$[1]
NATALIA DRICHKO, COLLIN BROHOLM, Department of Physics and Astronomy, Johns Hopkins University, Baltimore 21218 MD USA, KENTA KIMURA, RIEKO ISHII, SATORU NAKATSUJU, Institute for Solid State Physics, University of Tokyo, Kashiwa, Chiba 277-8581, Japan — The frustrated magnet $Ba_3CuSb_2O_9$ does not exhibit either structural or magnetic ordering down to the lowest measured temperatures and is of great current interest as a spin-liquid candidate. It has been proposed recently that the lack of ordering is due to a static or dynamic Jahn-Teller distortion that leads to orbital disorder [1]. We use phonon Raman scattering at temperatures between 20 and 380 K to investigate Jahn-Teller distortion in crystals with different Sb:Cu stoichiometry. We focus on phonons in the range of 500-800 cm^{-1} attributable to oxygen vibrations. In addition to signatures of the strong disorder due to Cu-Sb site mixing present in these materials, we observe mode-splitting due to a static Jahn-Teller distortion below 200 K in samples that undergo a transition to an orthorhombic phase. In contrast, samples that remain hexagonal to the lowest temperatures do not show such mode splitting. References: [1] S. Nakatsuji et al. Science 336, 559 (2012)

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