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Magnetic Resonance Studies of Crystalline $Ge_2Sb_2Te_5$and Sb_2Te_3[1] DAVID BOBELA, University of Utah, P. CRAIG TAYLOR, Colorado School of Mines — Recent technological applications of some chalcogenide materials, which are materials containing a group VI atom, have prompted studies of the local atomic structure of the amorphous phase. In particular, $Ge_2Sb_2Te_5$ has been employed as the prototypical phase-change memory material, since its structure can be rapidly switched from the crystalline phase to the amorphous phase with high fidelity. The metastability in the local bonding structure that produces this phase-change phenomenon is not yet understood. Magnetic resonance methods can be used to study local order as a function of the stoichiometry and phase of the material. As a starting point in understanding the magnetic resonance data for amorphous $Ge_2Sb_2Te_5$, we have used nuclear magnetic resonance and nuclear quadrupole resonance techniques to study crystalline $Ge_2Sb_2Te_5$ and Sb_2Te_3. We present estimates of the quadrupole coupling constants, and the asymmetry parameters of the electric field gradient for the ^{121}Sb nuclei. The relationship between these parameters and the local atomic structure of crystalline $Ge_2Sb_2Te_5$ will be discussed. In particular, the Sb sites appear to depart from axial symmetry, a conclusion that is difficult to obtain from standard scattering experiments.

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