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Magnetostriction to 100T in SrCu2(BO3)2: magnetic pantograph effect and tuning of J'/J ratio M. JAIME, NHMFL-LANL, A. SAUL, CiNAM/CNRS, CEE/MIT, G. RATDKE, IMPMC/CNRS, M.B. SALAMON, Physics, UT Dallas, H.A. DABKOWSKA, McMaster Univ. — The magnetostriction of the frustrated spin dimer system $SrCu_2(BO_3)_2$ was measured in pulsed high magnetic fields with an optical fiber Bragg grating technique. Both longitudinal (c-axis) and transverse (ab-plane) magnetostriction were obtained to H = 60T for H // c-axis, observing a reduction of the unit cell volume as the sample is magnetized past the 1/3 saturation magnetization plateau. Modest changes in the lattice parameters, when combined with existing elastic nneutron scattering data, suggest significant changes in the Cu-O-Cu bond angles (superexchange) through a pantograph effect as the sample is driven into highly polarized magnetic states. Supporting computations reveal an increase of the ratio of intra- to inter-dimer exchange integrals (J'/J) with a decrease in the Cu-O-Cu angle, and the concomitant drop in unit cell volume. These results impact our reading of existing predictions for the (H,T) phase diagram, and predictions for the effect of hydrostatic pressures on the ground state.

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