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Antiferromagnetism and a Dimensional Crossover in the Model Quantum Magnet $SrCu_2(BO_3)_2$ SARA HARAVIFARD, The University of Chicago/Argonne National Laboratory, ARNAB BANERJEE, The University of Chicago/Oak Ridge National Laboratory, JASPER VAN WEZEL , The University of Brsitol, DANIEL SILEVITCH, The University of Chicago, ANTONIO MOREIRA DOS SANTOS, Oak Ridge National Laboratory, JONATHAN LANG, Argonne National Laboratory, EDWIN KERMARREC, McMaster University, GEORGE SRAJER, Argonne National Laboratory, BRUCE GAULIN, HANNA DABKOWSKA, McMaster University, THOMAS ROSENBAUM, The University of Chicago — $SrCu_2(BO_3)_2$ has corner-sharing Cu^{2+} S=1/2 dimers lying on a square lattice, corresponding to the two-dimensional Shastry-Sutherland model. We conduct high resolution x-ray and neutron diffraction measurements as a function of pressure, tuning the ground state from a singlet ground state to long-range order. We report a change in crystal symmetry as a function of temperature for pressures above 4 GPa, linked to antiferromagnetism and the tilting of the dimers out of the plane. The inclusion of Dzyaloshinskii-Moriya interactions in the Shastry-Sutherland Hamiltonian helps explain the experimental results.

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