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Topological Triplon Modes and Bound States in a Shastry-Sutherland Magnet PAUL MCCLARTY, ISIS, Science and Technology Facilities Council., FRANK KRUGER, ISIS, Science and Technology Facilities Council and UCL., TATIANA GUIDI, STEWART PARKER, ISIS, Science and Technology Facilities Council., KEITH REFSON, ISIS, Science and Technology Facilities Council and RHUL., TONY PARKER, Central Laser Facility, Science and Technology Facilities Council., DHARMALINGAM PRABHAKARAN, RADU COLDEA, Clarendon Laboratory, University of Oxford. — The twin discoveries of the quantum Hall effect, in the 1980s, and of topoogical band insulators, in the 2000s, were landmarks in physics that enriched our view of the electronic properties of solids. In a nutshell, these discoveries have taught us that quantum mechanical wavefunctions in crystalline solids may carry nontrivial topological invariants which have ramifications for the observable physics. One of the side effects of the recent topological insulator revolution has been that such physics is much more widespread than was appreciated ten years ago. For example, while topological insulators were originally studied in the context of electron wavefunctions, recent work has led to proposals of topological insulators in bosonic systems: in photonic crystals, in the vibrational modes of crystals, and in the excitations of ordered magnets. Using inelastic neutron scattering along with theoretical calculations we demonstrate that, in a weak magnetic field, the dimerized quantum magnet $SrCu_2(BO_3)_2$ is a bosonic topological insulator with nonzero Chern number in the triplon bands and topologically protected chiral edge excitations.

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