

CSU PHYSICS SEMINAR

“Surprises in Quantum Magnetism: Tetris, Entanglement, and Spin Liquids ”

Alan Tennant

University of Tennessee

Monday, April 17th at 4:00 PM

120 Engineering (Hammond Auditorium)

Abstract

Advances in understanding quantum states in spin networks are closely tied to quantum information. Entanglement and its consequences provide ways to not only generate new physical phenomena but also to realize topological quantum information processing. These developments pose new challenges to experiment and understanding of quantum coherence and its relation to temperature. I explore this by showing recent work on application of entanglement witnesses to neutron experiments and other work on unexpected thermal effects on highly quantum states.

Biography

Alan Tennant is a Professor of Physics and Materials at the University of Tennessee, which he joined in 2022, and is Director of the Shull Wollan Center which supports education, research, and industry in the field of neutron sciences. Before joining UT he was a Distinguished Scientist at Oak Ridge National Laboratory first as Chief Scientist for Neutrons then as Labwide Quantum Materials Initiative Lead. During this time, he played a leading role in the transformation of the Spallation Neutron Source from a build project to a running science center nearly doubling the number of papers in four years, developed the three-source strategy, and successfully made the case for the Second Target Station a new \$2BN next generation neutron source due for completion in the next 10 years. His work in developing quantum materials at Oak Ridge was key to bringing the Quantum Science Center, one of five national quantum centers funded by the National Quantum Initiative Act of Congress, to the laboratory. Prior to moving to the US in 2013 he was Professor of Physics at Technical University Berlin and director of the Berlin Neutron Scattering Center, a German national neutron facility serving 300 users per year, as well as the Institute for Complex Magnetic Materials, which focused on research into quantum materials and spintronics using a comprehensive suite of photon and neutron capabilities. He also directed the User Platform which operated the BESSY II 3rd generation synchrotron for more than 1000 users per year. Prof. Tennant was born in Edinburgh, Scotland, and graduated in Physics at Edinburgh University before studying for his PhD with Roger Cowley at Oxford University. His awards include being the recipient of the European Physics Prize, Condensed Matter, 2012, and his research was recognized as one of Science magazine's top 10 breakthroughs, 2009.