Abstract Submitted
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Pressure-induced structural distortions in copper pyrazine dinitrate[1] KENNETH O'NEAL, JUDY CHERIAN, University of Tennessee, CHRIS LANDEE, MARK TURNBULL, Clark University, ZHENXIAN LIU, Carnegie Institute of Washington, JANICE MUSFELDT, University of Tennessee — The vibrational properties of quasi-one-dimensional Heisenberg antiferromagnet copper pyrazine dinitrate were investigated up to 9 GPa using diamond anvil cell techniques and infrared and Raman spectroscopy. Two structural transitions were discovered, at 0.7 GPa and around 5 GPa. The lower pressure transition involves only the nitrate ligands, revealing enhanced interchain interactions. The higher pressure transition includes modes throughout the spectrum. Importantly, the pyrazine ring-related modes show an overall lowering of symmetry through this transition. Ring buckling under pressure likely reduces the exchange along the chains since the exchange pathway becomes distorted. A smaller J may therefore lower the magnetic field of the quantum critical transition. This tunable exchange interaction could be utilized in other pyrazine bridged molecular systems to bring the quantum critical behavior into experimentally realizable fields.

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