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### **Low-energy Spectroscopy on Magnetic Materials**

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Low-energy spectroscopy at extreme conditions opens door to discovery and understanding of novel phenomena in condensed matter physics. Combining spectroscopy with one or more external parameters such as low temperature, high pressure and high magnetic fields, allows us to continuously induce perturbations to probe properties of materials across their phase diagram. Among low-energy spectroscopic techniques, THz, infrared (IR) spectroscopy, Raman scattering and electron paramagnetic resonance (EPR) spectroscopy are powerful tools to investigate the fundamental energy scales involved in the interplay of charge, spin, lattice and orbital degrees of freedom. Recently, we employed magneto-Raman spectroscopy on two different kinds of magnetic materials; the first compound being the Shastry-Sutherland compound  $\text{SrCu}_2(\text{BO}_3)_2$  and the second compound is the multi-ferroic metal organic framework  $[(\text{CH}_3)_2\text{NH}_2]\text{Co}(\text{HCOO})_3$ . We performed magneto-Raman spectroscopic measurements on those two compounds at magnetic fields up to 45 T to investigate the nature of magnetoelastic coupling in these magnetic materials. In this talk, I will present our recent results in detail and explain their implications. This work has been performed at the user facilities in the National High Magnetic Field Laboratory (NHMFL), Tallahassee. The NHMFL is supported by the National Science Foundation through NSF/DMR-1644779 and the state of Florida. The project is also funded by DoN HBCU/MI program award # N000141713061