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Resonant Ultrasound Spectroscopy at Low Temperature and High Magnetic Field DANIEL SHAW, Colorado State University, KATE ROSS GROUP TEAM — Resonant Ultrasound Spectroscopy (RUS) is an extremely sensitive measurement tool, which allows detection of quantum phenomena. By measuring the resonances of a sample at certain temperatures and magnetic fields, one can establish properties such as; elastic moduli, sample integrity, and phase changes (first and second order). Our group is particularly interested in probing the effects experienced by the crystal lattice due to spin orbit coupling. The resonant frequencies shine light upon effects like magnetostrsiction, which is stronger in these systems. Much of the physics we are interested in happens at either low temperatures (<10K) or at high fields (>2T), or both. For this we have developed a probe for performing RUS within a Quantum Dynamics Physical Property Measurement System (PPMS), which allows us to run our experiments while varying temperature and magnetic field. Our recent work has been centered upon taking these measurements within these extreme environments with precision. I will detail not only the experimental setup and the process of creating it, but also some preliminary results. Illustrating how we are able to use RUS measurements and the future of the project.

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