Resonant Ultrasound Spectroscopy: Elastic Moduli and Beyond

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ABSTRACT: Resonant Ultrasound Spectroscopy (RUS) is a unique technique for determining the elastic moduli of solids, based on the measurement of the resonances of a freely vibrating body. Using RUS, the magnitude of the elastic constants –and thus sound velocity– can be measured at room temperature with high accuracy (the shear modulus is usually determined with a precision of 0.05% or better), and RUS can also easily be performed as a function of temperature. The technique has therefore proven to be a valuable tool in materials physics research, as a complete description of a crystal's elasticity contains a wealth of information. Through measurements of the changes in the elastic tensor as a function of temperature and/or magnetic field through a phase transition, it is possible to gather detailed information about the changes in the lattice or electronic structure of the crystal. In this talk, I will review the principles and advantages of RUS and, using recent data obtained on a variety of materials, illustrate how RUS can contribute to a better of understanding of complex materials.

ALL ARE WELCOME!!!