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Title:

Introduction to the ultrasonic measurement technique

Abstract:

The ultrasonic measurement technique is not as often used as other techniques in solid state physics. Nevertheless, it is still a very powerful tool that gives a lot of valuable information, especially on phase transitions taking place in solid. The basic idea of this probe is that any order that lives in a solid and that couples to its lattice will modify how distortion waves propagate.

In this introductory talk I will explain how we can use an acoustic interferometer to measure sound speed and sound attenuation in solids. I will show how we can use these measurements to acquire precious knowledge on phase transitions taking place in solid matter. To do that I will begin by reviewing the elastic theory in solid and then I'll use a simple Ginzburg-Landau coupling model with the help of symmetries and group theory. The whole presentation will be using measurements on the superconducting transition of 2D organic compounds of the κ -(BEDT-TTF)₂X₂ family to illustrate the technique and its analysis.