Study of Acoustic de Haas - van Alphen Phenomena in URu_2Si_2

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Introduction

Acoustic quantum oscillations in the superconducting mixed state have been studied in just a couple of works and never been studied on URu_2Si_2. In our previous experiments [1] we found quantum oscillations of ultrasound velocity and attenuation in the URu_2Si_2 normal state, when a longitudinal wave propagated along the a-axis, while the magnetic field was applied in perpendicular direction – along the c-axis. The goal of this experiment was to perform acoustic measurements in the mixed state and to study electron-phonons interaction for electrons related to different bands.

Experimental

Two lithium niobate transducers have been glued to two opposite sides of a URu_2Si_2 crystal. Attenuation and velocity of a transverse wave propagated along a-axis and polarized along c-axis were studied in magnetic fields of up to 18T at temperature 0.3K. The sample was rotated in the magnetic field.

Results and Discussion

Unfortunately we found that sensitivity of the technique used is not high enough to observe quantum oscillations in the mixed superconductive state at temperature 0.3K, while in the normal state we studied oscillation at temperatures of up to 0.5K. It may be the reason for limited amount of publications related to this topic.

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References

[1] Suslov, A.V., *et al*., AIP Conf. Proc. **850**, 1173 (2006).