Temperature-Dependent Rzz and Rxx in Untra-Quantum Limit of Graphite

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Introduction

The physics beyond quantum limit in graphite is always elusive. The magnetoresistance Rxx shows strange behavior. After the field is applied, the Rxx increases up to 15T, then drops suddenly beyond 20T. On the other hand, the Rzz is less studied.

Experimental

We carried out a detailed temperature-dependent Rxx and Rzz. The Rxx is showed in Fig.1. The Rxx is increased with

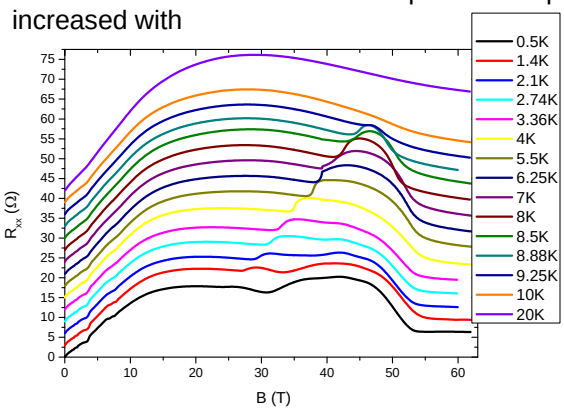

Fig.1 temperature-dependent in-plane Rxx in the pulsed field up to 60T. The reported transitions around 22T and 54T are evident.

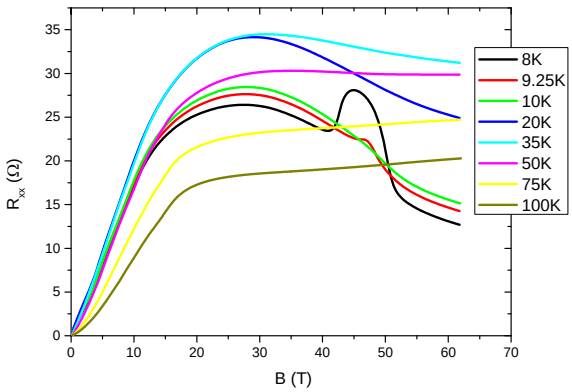

Fig.2 Higher temperature-dependent Rxx up to 100K, the negative magnetoresitance beyond 20T changes to positive magnetoresistance at 35K.

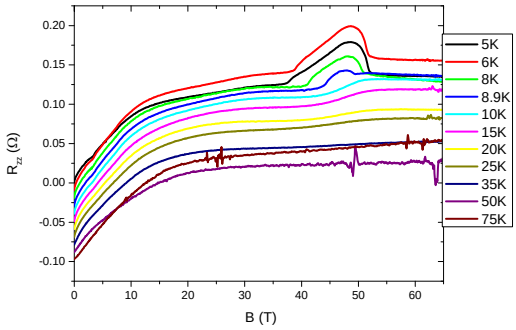

Fig.3 the kink at 46T sustains up to 35K even the transition finished around 10K.

Results and Discussion

A change from the negative magnetoresistance in low temperature to positive magnetoresistance in high temperature is observed. The scattering mechanic might change from e-p scattering to e-ion scattering. The kink at 46T sustains up to 35K even the transition finished around 10K. The more detailed theory is needed to explain both observations.

Conclusions

We performed temperature-dependent Rzz and Rxx measurement. The observation in Rxx with negative magnetoresistance to positive beyond 20T is observed at 35K. A kink is also observed at 46T sustains to 35K.

Acknowledgements

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