UNIVERSITÄT LEIPZIG

Fakultät für Physik und Geowissenschaften

Prof. Dr. C. Jacobi, Dekan

Fakultäts-Kolloquium

Dienstag, 18. Oktober 2022, 17:00 Uhr

Prof. Dr. Inti Sodemann Villadiego

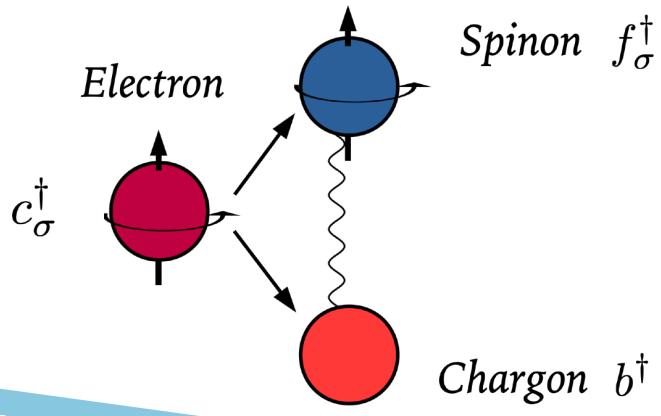
Institut für Theoretische Physik, Universität Leipzig

Chasing the Spinon Fermi Surface State

The Spinon Fermi Surface State is a fascinating quantum state of matter that features particles with spin-charge fractionalization and emergent gauge fields. Its existence was conjectured by Phil Anderson in the 80's, but despite decades of research its detection in real materials has remained elusive.

I will describe new ideas on how to search for this state in experiments. I will show how in spite of being an electrical insulator, this state can display quantum oscillations and low frequency cyclotron resonances in response to magnetic fields. I will also describe how its peculiar magnetic noise could be detected with nitrogen vacancy center sensors.

I will also introduce a new "pseudo-scalar" variant of the original Anderson's Spinon Fermi Surface State, inspired by the recent experimental discovery of oscillations of the thermal conductivity in the material α-$RuCl_3$. This allows to understand why α-$RuCl_3$ can display quantum oscillations of the thermal conductivity without an accompanying thermal Hall effect.



Hörsaal für Theoretische Physik, Linnéstraße 5, 04103 Leipzig

Alle Teilnehmer sind ab 16:30 Uhr zu Kaffee vor dem Hörsaal sowie im Anschluss an den Vortrag zu einem Empfang in der Aula eingeladen.