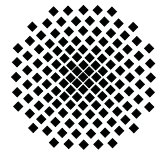


Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme
Fachbereich Physik, Universität Stuttgart

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17.15 Uhr

Hörsaal 2 D5

Stuttgarter Max-Planck-Institute, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Interactions and disorder in topological quantum matters

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Abstract

The emergence of topological order is one of the most intriguing phenomena in quantum many-body physics and one of possibly far reaching relevance – topological quantum matter is increasingly appreciated as possible medium for quantum computation purposes. In this colloquium I will give a short overview of the formation of topological quantum matter in a variety of physical systems – both from an experimental and a more conceptual point of view. The stability of topological order against local perturbations is one of its defining characteristics, which I will discuss in regard to actual experimental settings and in light of theoretical proposals to build a topological quantum computer. Our own interest in this realm has focused on the effects of interactions and disorder on the collective quantum state formed by a set of topological excitations, so-called anyons. One of the possible instabilities – the formation of a thermal metal state – leads to the somewhat counterintuitive conclusion that in order to make a quantum computer work a little heat could actually help.