Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme
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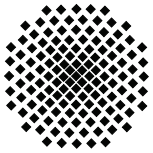

Dienstag, 8. April 2014 | **17.15 Uhr** | **Hörsaal 2 D5**

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

Making and manipulating Majorana fermions for topological quantum computation

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Abstract

Although known theoretically for decades, Majorana fermions have never been observed as fundamental particles. But there is currently much excitement among condensed matter physicists that Majorana fermions can be realized and observed as quasiparticles in the solid state. This excitement is fueled by their remarkable properties: They are not only their own antiparticle, but zero-energy Majorana fermions also obey an exotic (and yet unobserved) form of quantum statistics called non-Abelian statistics which differs fundamentally from conventional bosonic or fermionic statistics. These properties make Majorana fermions the simplest platform for realizing topological quantum information processing which could go a long way towards alleviating the problem of decoherence in conventional quantum computation. In this talk, I will give an introduction to various recent theoretical proposals and experimental attempts to observe Majorana fermions in condensed matter systems.