UNIVERSITÄT DUISBURG ESSEN

PHYSIK E=

Physikalisches Kolloquium

Mittwoch, 19.07.2017
13:00 Uhr
Hörsaal MC 122

Spin liquids and Majorana metals in Kitaev materials

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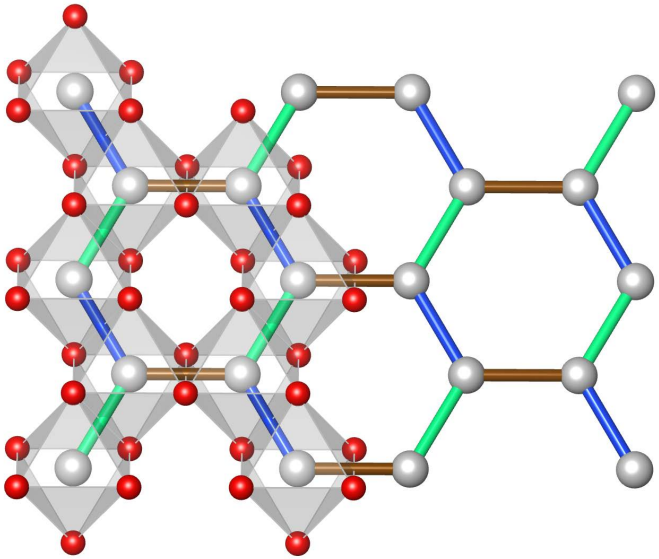

One of the most intriguing phenomena in strongly correlated systems is the fractionalization of quantum numbers, where the original microscopic degrees of freedom literally break up at low temperatures. In their place, novel degrees of freedom emerge that are described by novel quantum numbers and might even have completely different particle statistics.

In this colloquium, I will discuss this phenomenon of fractionalization in the context of a novel class of materials, spin-orbit entangled Mott insulators. Here the original spin-orbit entangled moments split up and the emergent degrees of freedom turn out to be Majorana fermions and a gauge field. The Majoranas are found to generically form almost conventional metallic states. The origin of such a dichotomous state — a Majorana metal in an electronic Mott insulator — is elucidated by a family of exactly solvable Kitaev models of frustrated quantum magnets in three dimensions. I will discuss why this physics might be of relevance to a class of recently synthesized iridate compounds.