

## **Physikalisches Kolloquium**

### **Spintronics and spin currents: from magnetic memories to black holes**

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Over the past two decades spintronics has been concerned with utilizing the electron spin rather than its charge. Most of the envisioned applications, predominantly in the context of magnetic memories, make use of the interaction between spin-polarized electric currents and magnetization dynamics in ferromagnets. A great deal of research has been devoted to understanding, characterizing and controlling these interactions. Recently, spintronics has moved beyond electronic spin currents. In this talk I will review some recent developments that centre around the conversion and interaction of spin currents between different carriers, such as electrons, spin waves and phonons. Building on these developments, I will also describe how the interaction between spin currents and magnetization dynamics can be used to implement black-hole horizons for spin waves. The latter are wave-like oscillations in the magnetization direction, also referred to as magnons. Finally, I will discuss how these black-hole-like horizons can be used to amplify spin waves and make a magnon laser. The latter idea may be important in the field of magnonics, that seeks to replace the electron with spin waves/magnons in dataprocessing applications.

**Der Gast wird betreut von Herrn Prof. Dr. Hillebrands**

**Gäste sind herzlich willkommen**

**Kaffeeausschank ab 17:00 Uhr**

**Montag, 01. Juli 2019, 17:15 Uhr**

**Gebäude 46 / Raum 46-270**