Seminar talk, October 9th 2018, building B, room 2.6. at 10 a.m.

Ms. Lisa-Marie Kern

With hundreds of millions of computer hard drives sold every year, magnetism represents the main repository of information storage. The high demand for data centers promoted by new technologies such as internet cloud access will further increase this dominance of magnetic data repositories. *Spintronics*, a recent and fastly expanding research field in nanophysics attracts attention from both, fundamental and applied research. It aims at the introduction of the *spin* as the new foundation not only for storage but also for information processing towards low-powerconsumption non-volatile-green electronics, known as an *all-spin-logic*.

After years seeking for a material that could provide an efficient platform for spin transport, it was finally found with graphene in the 2D materials family. Since then, 2D materials have been thought to be probably the best platform for the future of spin electronics, enabling long distance spin transport while potentially simultaneously offering for spin manipulation through surface manipulation/gating. However, while efficient spin transport has been shown for metallic graphene it has remained elusive in the case of semiconductors.

The objective of this master thesis was to go one step beyond and study simultaneously two low spin-orbit 2D materials, metallic graphene and semiconducting black phosphorus, as new platforms for spin transport. For a better understanding of the involved phenomena, their spin dependent transport was studied in the prototypical spintronics device, the lateral spin-valve which is also the easiest conceivable showcase scenario.