GOETHE UNIVERSITÄT FRANKFURT AM MAIN

Fachbereich Physik
Institut für Theoretische Physik

CONDENSED MATTER THEORY SEMINAR

Subject: **Magnon damping in the zigzag phase of the Kitaev-Heisenberg-Gamma model on a honeycomb lattice**

Speaker: **Roman Smit (ITP, Goethe-Universität Frankfurt)**

Date & time: **Friday, February 7th, 2020 at 3:15 p.m.**

Venue: **Seminar room 1.114**

The Kitaev model is an exactly solvable spin-1/2 model that hosts a spin liquid phase with non-abelian anyons which could theoretically be used as topologically stabilized quantum bits in a quantum computer. In 2009, Jackeli and Khaliullin proposed a physical mechanism that could potentially lead to experimental realizations of the Kitaev model. The candidate materials found so far are however more complicated than the Kitaev model due to non-negligible additional interactions like the Heisenberg interaction. We found a special parameter space of one of these extended Kitaev models that allows to carry out the Bogoliubov transformation of spin waves in the (ordered) zigzag phase analytically. This allowed us to numerically calculate the magnon damping, which prior to our work was only possible with very crude approximations.

In this talk, I will give a brief introduction to the field of Kitaev candidate materials. I will present the method that allowed us to find the special parameter space and the Bogoliubov transformation. This method is quite general and can be applied to other bosonic systems as well. Finally, I will present our numerical results for the magnon damping and explain how they help understanding the Kitaev candidate materials. The talk is based on our paper arxiv:1911.12829 (to be published).