

SFB – Colloquium

Speaker: **Dr. Florian Dirnberger**
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Date: Tuesday, 12 July 2022, 14:15, H34

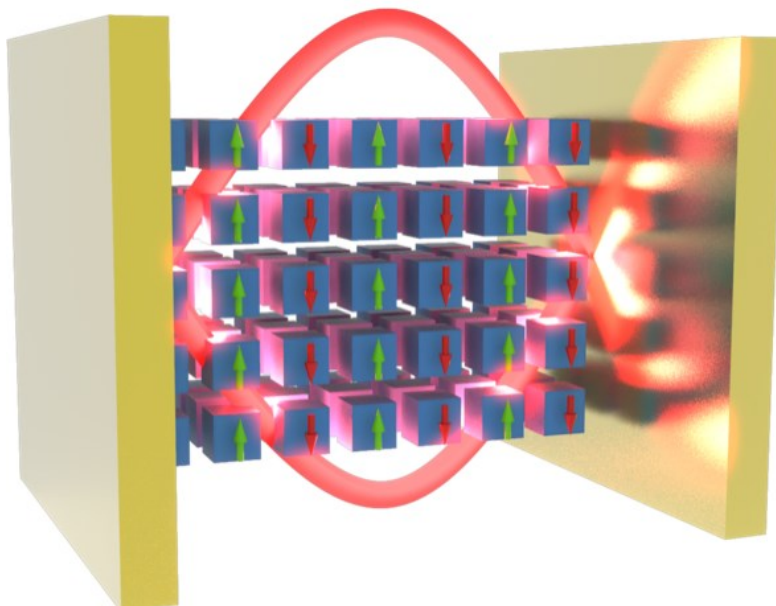
Topic: Spin-correlated excitons and exciton-polaritons in van der Waals magnets



Abstract:

Van der Waals (vdW) magnetic crystals recently revealed a rare type of optically active excitons, inherently coupled to the long-range magnetic order, offering an exciting platform to uncover new facets of light-matter interactions. In this talk, I will introduce and discuss spin-correlated excitons based on two examples of vdW magnetic crystals. First, I will illustrate the mechanisms behind the magnetic coupling of excitons and exciton polaritons through an experimental study on the vdW magnetic semiconductor CrSBr. Then, I will discuss our recent demonstration [1] of strong light-matter coupling in NiPS₃, a van der Waals antiferromagnet with highly correlated electronic degrees of freedom. In these materials a previously unobserved class of polaritonic quasiparticles emerges from the strong coupling between spin-correlated excitons and the photons inside a microcavity. The resulting hybridization with light offers unique opportunities to study their origin and interactions in antiferromagnetic insulators.

[1] F. Dirnberger, R. Bushati, B. Datta, A. Kumar, A. H. MacDonald, E. Baldini, and V. M. Menon, Spin-correlated exciton-polaritons in a van der Waals magnet, *Nature Nanotechnology* (in press, arXiv: 2203.06129).



Hosts: Prof. Dr. Dominique Bougeard
and Prof. Dr. Rupert Huber

Optical resonator enhanced coupling of photons and spin-correlated excitations in a van der Waals magnetic crystal.