



e-conversion



## Seminar announcement

Tuesday, November 15, 2022

1:30 pm

WSI, Seminar room S 101

### “Exciton-polaritons in van der Waals magnets”

The recent discovery of magnetic excitons in van der Waals crystals offers extraordinary opportunities to study new interactions between magnetism and light. By coupling optical microcavity fields to these excitons, we were able to investigate a previously unobserved class of polaritons with unique properties demonstrated to emerge from excitons, photons and spins. In this talk, I will introduce two different van der Waals magnets that host such polaritons. One of them is NiPS<sub>3</sub>, an antiferromagnet from the family of Mott insulators with highly correlated magnetic and electronic degrees of freedom. A detailed spectroscopic analysis of its polaritons, in conjunction with our microscopic theory, shows that such magnetically coupled optical excitations can have an origin and interactions that are very different from those of excitons in conventional band semiconductors [1]. The second example is CrSBr, a van der Waals magnetic semiconductor with excitons that are shown to couple exceptionally strongly to photons and magnons. Our work paves the way for controlling optical responses to magnetic phenomena via cavity quantum electrodynamics.



[1] **F. Dirnberger**, R. Bushati, B. Datta, A. Kumar, A. H. MacDonald, E. Baldini, V. M. Menon, Spin-correlated exciton-polaritons in a van der Waals magnet, *Nature Nanotechnology*, 17, 1060–1064 (2022)

**Dr. Florian Dirnberger**  
Department of Physics  
City College of New York  
USA