IST AUSTRIA
Institute of Science and Technology

Physical Sciences Seminar

Topological quantum matter in van der Waals materials: non-Abelian excitations and new experimental probes

Zlatko Papic (University of Leeds)

Host: Maksym Serbyn

Topological quantum matter is believed to be host to an exotic type of particle called anyon. Unlike ordinary fermions and bosons, anyons may obey non-Abelian statistics
-- a property that could help realize fault tolerant quantum computation. Non-Abelian anyons have long been predicted to occur in the fractional quantum Hall (FQH) phases that form in two-dimensional electron gases in the presence of a large magnetic field. However, direct experimental evidence of anyons has remained elusive. In this talk I will present our proposal for experimentally visualizing the structure of interacting electronic states using the scanning tunneling microscope (STM). This method is capable of detecting the unique signatures of anyons, and it is particularly well-suited to semiconducting transition-metal dichalcogenides, a new class of 2D electron systems whose atomically thin structure -- just like graphene -- facilitates gate-tunability. I will review the recent observation of FQH states in one such material WSe2, including an even-denominator FQH state that is expected to host non-Abelian anyons.
These results suggest that van der Waals materials could provide a versatile experimental platform that may enable to directly detect -- and perhaps ultimately manipulate
-- the exotic anyon particles.

Friday, January 17, 2020 11:00am - 12:00pm

IST Austria Campus Heinzel Seminar Room / Office Bldg West (I21.EG.101)

This invitation is valid as a ticket for the IST Shuttle from and to Heiligenstadt Station. Please find a schedule of the IST Shuttle on our webpage: https://ist.ac.at/en/campus/how-to-get-here/ The IST Shuttle bus is marked IST Shuttle (#142) and has the Institute Logo printed on the side.