

# CMP Seminar

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## **Quantum condensates in the flat land: bridging the superfluidity and superconductivity**

2D materials offer a unique material platform, where electrons are confined in a world with no thickness. In this flatland, electrons move around each other in a fashion that is drastically different compared to the 3D world we are familiar with. The exotic rules that determines electron motion in the flatland allow us to have excellent control on the motion of electrons, making it possible to build electronic devices out of 2D material that can be used in future quantum computers. Most remarkably, the extreme thickness, or thinness, of 2D material provides us the opportunity to study quantum phenomena that do not existed in bulk materials, such as the Bose-Einstein condensate (BEC) of electron-hole pairs. In this talk I will discuss the unusual behavior of electron flow in this BEC phase, which demonstrates a connection between two distinct paradigms of quantum condensates in condensed matter physics: the superfluidity and superconductivity.

Monday, March 30<sup>th</sup>, 2020 at 4:10 p.m.  
Room: 1400 BPS Bldg.  
Host: Johannes Pollanen