

---

# Title: Odd-integer quantum Hall states and giant spin susceptibility in p-type few-layer WSe<sub>2</sub>

Ning Wang\*<sup>1</sup>

<sup>1</sup>Department of Physics and the Center for Quantum Materials, the Hong Kong University of Science and Technology – Hong Kong SAR China

## Abstract

We observed quantum Hall effects (QHE) in p-type few-layer WSe<sub>2</sub> for the first time, and surprisingly these QHE's were predominated at odd-integer filling factors. This remarkable phenomenon arises from the super large effective mass and giant spin susceptibility of the hole carriers of few-layer WSe<sub>2</sub>. In two-dimensional electron gas (2DEG) systems, QHE's occur predominately at even-integer filling factors because the Zeeman energy is normally much smaller than the cyclotron energy. In addition, the quantum transport in atomically thin transition metal dichalcogenides had long been limited by the device fabrication and purification. In this talk, I demonstrate the fabrication of p-type WSe<sub>2</sub> field-effect transistors with mobility up to 12,000 cm<sup>2</sup>/V s, which facilitated the aforementioned unexpected observations. We further observed that the Zeeman energy, enhanced by electron-electron interactions, is about three times as large as the cyclotron energy. Our results directly suggest that few-layer WSe<sub>2</sub> offers a novel and unique platform for exploring strongly correlated physics.

---

\*Speaker