

## Weekly Seminar

## Optical spectroscopy and control of valley excitons in 2D semiconductors

## Time: 3: 00 pm, Oct. 11, 2019 (Friday) 2019 10 11 3:00 Venue: Room W563, Physics building, Peking University 563

## Abstract

Valley polarization associated with the occupancy in energy degenerate but quantum mechanically distinct valleys in the momentum space resembles the spin polarization in many aspects, including the valley magnetic moment, optical selection rule, and valley hall effect. Atomically thin transition metal dichalcogenides (TMDs), a class of honeycomb-like layered materials with broken inversion symmetry and significant spin-orbital coupling, can host robust valley polarization and therefore become an important platform for studying valley-dependent physics. We demonstrated that the valley polarization in the TMD can not only be initialized and measured but also be manipulated coherently by light. (1) Ultrafast valley pseudospin rotation was achieved by leveraging the intense electric field in the fs laser pulse. Both the direction and speed of rotation can be controlled by fine-tuning the dynamic phase difference between the exciton wavefunction in opposite valleys. The pseudospin rotation was reflected in the shift of the photoluminescence polarization orientation. By varying the time delay between the excitation and