**Abstract:** Two-dimensional (2D) hexagonal materials provide a promising platform for valleytronics devices, owing to the convenient accessibility of valley degree of freedom. However, efficient generation of valley information carriers with long valley lifetime is difficult to achieve in single material due to intrinsic valley relaxation channels. I will show that such intrinsic limit can be overcome through combining two materials into a van der Waals heterostructure, enabling near-perfect generation efficiency of valley information carriers, as well as record-high valley lifetime. Furthermore, we demonstrate generation, transport, and spatial-temporal imaging of pure valley currents in a single device, which opens up new exciting opportunities to realize novel spintronic and valleytronic applications.

**Bio:** Dr. Chenhao Jin received his physics Ph.D. from University of California, Berkeley in 2017, where he was awarded the Lars Commins Memorial Award in Experimental Physics. He is currently a Kavli research fellow at Cornell University. His research interest focused on using optical spectroscopy to probe electronic, optical and optoelectronic properties of van der Waals systems, ranging from carbon nanotube, graphene, black phosphorous, transition metal dichalcogenides (TMDCs) to two-dimensional ferromagnetic materials. He also made seminal contribution in understanding the ultrafast dynamics in van der Waals heterostructures, such as TDMC-TMDC bilayers.