Remote Condensed Matter Physics Seminar

The Quantum Psychology of Dark Excitons: 
*the case of the traumatic separation*

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4pm – 5pm
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via Zoom (click link below to join seminar. Meeting ID: 874-837-760)
URL: [https://ntu-sg.zoom.us/j/874837760](https://ntu-sg.zoom.us/j/874837760) Meeting Password: 287362

About a decade ago, the discovery of monolayers of transition metal dichalcogenides opened a new frontier in the study of optically excited states in semiconductors, and related opto-electronic technologies. These materials exhibit a plethora of robust excitonic states, such as bright excitons at the K & K’ valleys, momentum- and spin-forbidden dark excitons, and hot excitons. Optics-based experiments have revealed much about the bright excitonic states, but they remain largely unable to access their valley character, their scattering channels into other valleys within the Brilloin Zone, and the nature of the dark excitonic states that form.

Angle-Resolved Photoemission Spectroscopy (ARPES) based techniques would be ideal to access the momentum degree of freedom of excitons, their momentum-resolved scattering channels, and the dark excitons that form on photoexcitation. But these are very challenging experiments – not just from the conceptual perspective of ‘how does one photoemit an exciton’, but also the technical perspective of measuring micron-scale, atomically-thin samples. In today’s talk, I will discuss the challenges involved, and progress made in my lab to date towards this aim. And – time permitting – we will end with an entertaining peek into the ‘quantum psychology of dark excitons’!

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