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Black Phosphorus Optoelectronics and Electronics¹

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Black phosphorus recently emerged as a promising new 2D material due to its widely tunable and direct bandgap, high carrier mobility and remarkable in-plane anisotropic electrical, optical and phonon properties. It serendipitously bridges the zero-gap graphene and the relatively large-bandgap transition metal dichalcogenides such as molybdenum disulfide (MoS₂). In this talk, I will first cover the basic properties of few-layer and thin-film black phosphorus, followed by a discussion of recent observation of highly anisotropic robust excitons in monolayer black phosphorus. Finally I will present a few potential applications of black phosphorus such as radio-frequency transistors and wideband photodetectors.

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