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FACHBEREICH  
PHYSIK

# › Allgemeines Physikalisches Kolloquium

› Donnerstag, 22.06.2017 um 16 Uhr c.t.

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## Atomically thin 2D materials: Optical fingerprint and ultrafast dynamics of bright and dark excitons

Monolayers of transition metal dichalcogenides build a new class of atomically thin two-dimensional materials with a huge potential for future nanoelectronics devices. They exhibit a remarkably strong Coulomb interaction giving rise to the formation of excitons – tightly bound electron-hole pairs. Beside optically accessible bright excitons, there is also a variety of dark excitonic states that photons cannot reach. We predict a novel sensor mechanism for molecules based on the activation of dark excitons resulting in a distinct signature in the optical fingerprint of the 2D materials. We also shed light on the ultrafast formation and dynamics of dark and bright excitons and reveal how they contribute to the emission of light in these technologically promising nanomaterials.