

**Joint Condensed Matter
and Center for Soft Matter and
Biological Physics Seminar**

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**“Fast and High Responsivity Graphene-based Photodetectors at
Room-temperature by Engineering Dielectric Films”**

Monday, September 23, 2019

4:00pm – 5:00pm

304 Robeson Hall

The realization of low-cost photodetectors with high quantum efficiency, high sensitivity, and fast photo-response in the visible and infrared remains one of the challenges in optoelectronics. Ideally, these photodetectors should be based on Complementary Metal-Oxide-Semiconductor (CMOS) compatible platform for monolithic integration with read-out electronics to provide for high-density, high-throughput and low-cost manufacturing. Graphene is ideally suitable for optoelectronic photodetectors sensitive from visible to infrared frequencies, and have proved to fulfil those requirements. Here, we have engineered the interface between graphene and dielectric Ta₂O₅ and Ti₂O₃ thin-films by e-beam evaporation method to introduce quantum dots as absorption centers from visible to infrared region. Our graphene-based photodetectors have showed a high responsivity up to 2×10^5 A/W as well as a fast response time in the nano-second time scale at room temperature. These results address key challenges for broadband photodetectors from visible to infrared region, and are promising for the development of graphene-based optoelectronic applications.