

## Seminar über Ultrafast Science and Technology

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**Titel:** Carbon Based Crystalline Photonic Devices

Carbon based materials have unique optical, mechanical and electronic properties that can be combined with chemical functionality. In the crystalline form, they reveal superior electronic performance. However, the use of organic single crystals in devices is still limited to a few applications, such as field-effect transistors. Very recently, we developed single-crystal interfaces presenting photoconductivity behaviour, [1] capable to extract excitons generated in acceptor materials. [2] By adequate material design and structural organisation it is possible to improve exciton diffusion efficiency, [3, 4] and use the concept of charge transfer interfaces in phototransistors. [5, 6] Inclusion of graphene as electrode, leads to high efficiency nanodevices, and high conduction, transparent textile fibers. [7] These results open the possibility of using carbon single-crystal in photonic and textile applications.

References: [1] Nature Commun., 2013, 4, 1842; [2] J. Mater. Chem. C, 2014, 2, 3639; [3] JACS, 2015, 137, 7104; [4] ACS Appl. Mater. Interfaces, 2015, 7, 27720; [5] Appl. Phys. Lett., 2015, 107, 223301; [6] Adv. Mater., 2017, 1702993; [7] Scientific Reports, 2015, 5, 9866.

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