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Chris Rehhagen

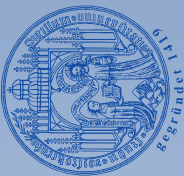
AG Dynamics of Molecular Systems

Optical spectroscopy on molecular crystals

Dye crystals are of rising interest in opto-electronic applications, especially due to potentially large exciton mobilities. Furthermore, crystals provide stable and regular structures which are well suited for common characterization methods. In this work, small crystals in the range of 10-500 μm are prepared from solutions of the dyes TTBC (*1,1',3,3'-tetraethyl-5,5',6,6'-tetrachlorobenzimidazolocarbocyanine*) and Coumarin153. To investigate their optical properties a microscope with a resolution of 50 μm is implemented for single-crystal absorption and fluorescence spectroscopy. The setup can also be combined with a streak-camera in order to investigate the dynamics of electronic excitations. Beyond this, Fluorescence Lifetime Imaging Microscopy is used to investigate the lifetime distribution within single dye crystals down to a spatial resolution of 200 nm. The results show, that there is a connection between the macroscopic structure of the crystals and their optical properties. The results are in line with theoretical considerations. Especially some TTBC crystals show fluorescence spectra with spectrally narrow components typical for J-type aggregation and a lifetime in the range of tens of picoseconds.

Talks in WS 2017/2018

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