

Antenna-based molecular optoelectronics

Initiative: Integration molekularer Komponenten in funktionale makroskopische Systeme (beendet, nur noch

Fortsetzungsanträge)

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Resonant optical antennae consist of two gold nano wires that are separated by a small feedgap (~1-10 nm) and have a total length close to half of the wavelength (~250 nm). Upon macroscopic illumination such antennae efficiently concentrate light into their nanoscopic feedgap volume providing an absorption cross section at visible to near infrared wavelengths that is considerably larger than the geometrical area of the antenna structure. Vice versa, light generated in the feedgap, e.g. by molecules, is efficiently radiated into the far field. Since optical antennae are two-terminal structures with nanoscopic feedgap, they provide the ideal platform to build devices based on light-induced nonequilibrium electronic transport phenomena in gap-spanning molecules. The project focuses on hybrid nano structures consisting of resonant optical antennae (Hecht group) and functional organic molecules (Würthner group) that exhibit efficient charge separation upon illumination. The concept represents a technical realization of the photosynthetic antenna complex and reaction center.

Projektbeteiligte

Prof. Dr. Bert Hecht

Universität Würzburg

Fakultät für Physik und Astronomie

Physikalisches Institut

Lehrstuhl für Experimentelle Physik 5

Würzburg

Prof. Dr. Frank Würthner

Universität Würzburg

Institut für Organische Chemie

Lehrstuhl für Organische Chemie II

Würzburg

