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Switching optical antennas via supramolecular translation

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

Bewilligung: 25.06.2017

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Projekt-Website: https://www.physik.uni-wuerzburg.de/ep5/nano-optics/ and https://www.chemie1.unibas.ch/~mayor/index.html

Optical antennas are able to efficiently link propagating light fields and nanolocalized excitations and are therefore ideally suited to bridge the gap between the macroscopic world and nanoscopic entities such as individual molecules placed inside the antenna feed gap. Recently, the toolbox of optical antennas has been enriched by the possibility to apply voltages to the antenna via electrical connectors which allows to generate enormous DC electric fields across the antenna gap. In this project two-color switchable optical antennas will be realized representing reconfigurable functional nanodevices by making use of electric-field induced supramolecular translations, i.e. the nanomechanical motion of ring-like moieties on rod-like molecules (Rotaxanes) placed in the antenna feedgap. Electrically-induced supramolecular translation of the ring moiety will cause selective quenching of one of up to two chromophores whereby its coupling to the antenna resonance will be suppressed. In the final configuration light emission shall even be electrically excited via inelastic electron tunneling and switched via the polarity of the applied voltage.

Projektbeteiligte

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Electrically-driven Yagi-Uda antennas for light