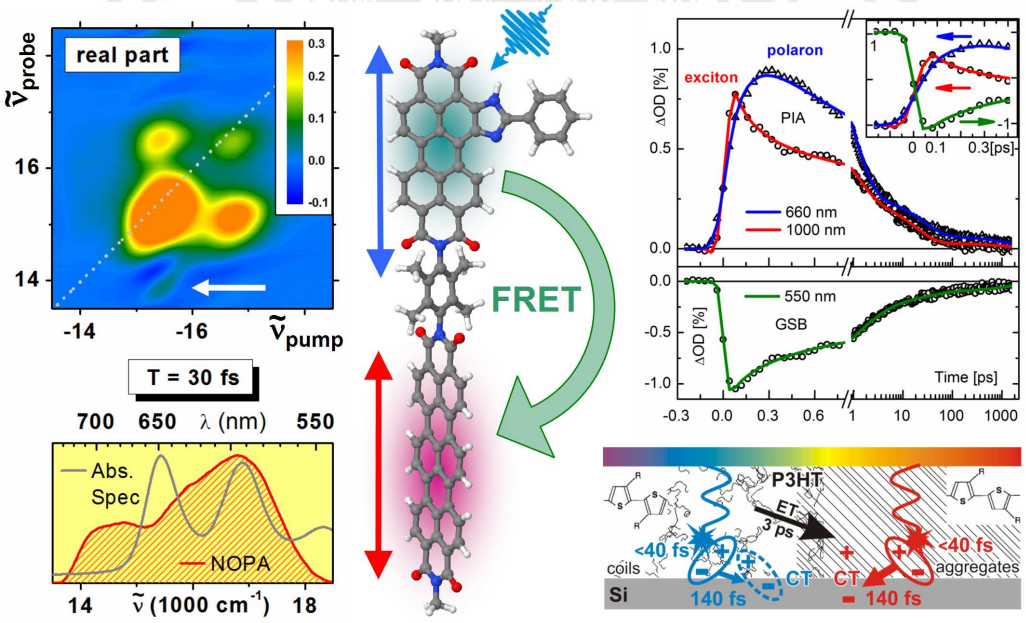
# PHYSIKALISCHES KOLLOQUIUM

AM 14. MAI 2012 UM 17 UHR C.T.

IM GROßEN HÖRSAAL




## ULTRABROADBAND FEMTOSECOND AND 2D SPECTROSCOPY: UNDERSTANDING THE PHYSICAL ORIGIN OF HYBRID ORGANIC SOLAR CELLS AND FRET

PROF. DR. EBERHARD RIEDLE

*FAKULTÄT FÜR PHYSIK, LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN*

The search for sustainable energy sources is one of the prime fields of research worldwide. The major part of the progress is contributed by material development, but novel approaches need a better understanding of the fundamental processes that ultimately limit the efficiencies. Similarly, bio-oriented microscopy heavily relies on Förster-Resonance-Energy-Transfer (FRET) to monitor, e.g., protein conformational changes - yet the underlying theory is still based on the concepts developed more than 50 years ago. In my talk I will show that cutting-edge femtosecond transient absorption spectroscopy and 2-dimensional electronic spectroscopy can give direct insight into primary couplings and processes. These measurements achieve sub-50 fs resolution, detection out to 1 ms and a spectral coverage from below 250 nm out to 1700 nm. With such a wide window of observation even highly complicated schemes can be analyzed unambiguously. We find an exciton dissociation in hybrid organic solar cells within 140 fs and demonstrate that nearly all common assumptions in FRET are of only limited validity for borderline examples readily encountered in applications.