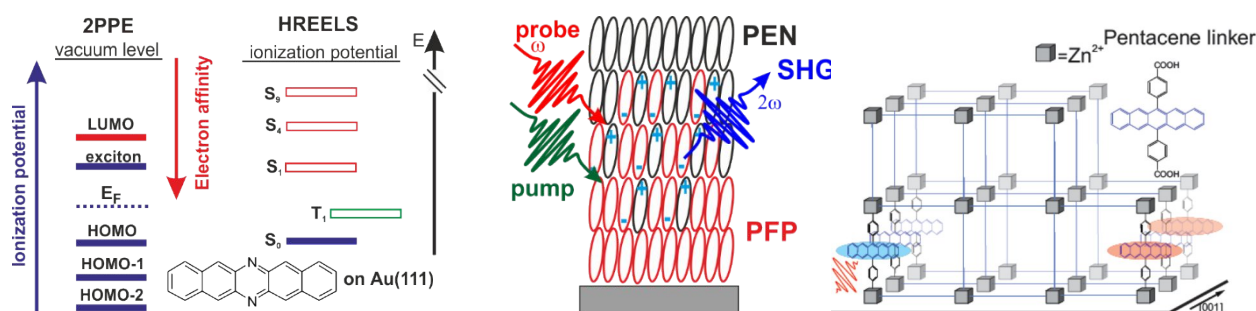


Electronic properties of interfaces with functional materials

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For improvement and optimization of the performance of organic molecule-based devices, such as photovoltaic cells and thin-film transistors comprehensive insight into the physical properties of the organic molecules at surfaces and interfaces is necessary. *N*-heteropolycyclic aromatic compounds are promising candidates for n-channel semiconductors. The introduction of nitrogen atoms into the π -backbone of the polycyclic aromatic hydrocarbons stabilizes the frontier orbitals and increases the electron affinity, while the size of the HOMO–LUMO (optical) gap is nearly unaffected. By using two-photon photoemission spectroscopy (2PPE) and high resolution electron energy loss spectroscopy (HREELS) we determined quantitatively transport, singlet and triplet states as well as electronic spectra of several *N*-heteropolycyclic molecules adsorbed on Au(111) [1–4]. Using time-resolved 2PPE we gained insights into the exciton dynamics and resolved processes on the femtosecond (fs) to picosecond timescale [2]. In addition, fs second harmonic generation (SHG) has been applied to illuminate the charge transfer dynamics at electron donor/acceptor interfaces [5, 6] and transient absorption (TA) spectroscopy to study the singlet fission dynamics in pentacene embedded in a surface anchored metal organic framework (SURMOF) [7].



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