# CHARGE AND SPIN TRANSPORT PHYSICS OF ORGANIC SEMICONDUCTORS

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Over recent years there has been tremendous progress in discovering new organic semiconductors that provide high charge carrier mobilities for both n-type and p-type device operation, good operational stability and other functionalities such as efficient electroluminescene, sensing or memory functions. These materials allow addressing an increasingly broad range of flexible and printed electronic applications based on controlled manufacturing of flexible plastic substrates by a combination of solution processing and direct printing. One of the sources of improvement in performance has been the versatility of organic chemistry to provide a broad range of new molecular structures and the ability to assemble these molecules into ordered structure with minimum degree of disorder. We will review recent insights into the device and charge transport physics of solution-processible small molecule as well as conjugated polymer organic semiconductors, with a particular focus on the microscopic processes that limit the field-effect mobility in these systems. We are also interested in understanding the spin transport physics of these materials and the relationship between molecular structure, microstructure and spin diffusion. Organic semiconductors may enable realisation of long spin relaxation times and long spin diffusion lengths due to the weak spin-orbit coupling in these carbon-based materials. We will present recent measurements of spin-transport in different molecular and polymeric semiconductors.