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Singlet-to-triplet intermediates and triplet exciton dynamics in pentacene thinfilms[1] VERNER THORSMOLLE, University of California San Diego, MICHAEL KORBER, University of Konstanz, EMANUEL OBERGFELL, Johannes Gutenberg University Mainz, University of Konstanz, THOMAS KUHLMAN, Technical University of Denmark, IAN CAMPBELL, BRIAN CRONE, ANTOINETTE TAYLOR, Los Alamos National Laboratory, RICHARD AVERITT, University of California San Diego, JURE DEMSAR, Johannes Gutenberg University Mainz, University of Konstanz — Singlet-to-triplet fission in organic semiconductors is a spin-conserving multiexciton process in which one spin-zero singlet excitation is converted into two spin-one triplet excitations on an ultrafast timescale. Current scientific interest into this carrier multiplication process is largely driven by prospects of enhancing the efficiency in photovoltaic applications by generating two long-lived triplet excitons by one photon. The fission process is known to involve intermediate states, known as correlated triplet pairs, with an overall singlet character, before being interchanged into uncorrelated triplets. Here we use broadband femtosecond real-time spectroscopy to study the excited state dynamics in pentacene thin films, elucidating the fission process and the role of intermediate triplet states.

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