

Cockcroft Institute Seminar

Studying novel solar cell materials with terahertz time-domain spectroscopy at ALICE

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Walton Rooms A & B, The Cockcroft Institute

Abstract

Novel solar energy cells could be fabricated using semiconductor nanostructures, such as quantum dots (QDs), to rival current silicon solar cells. The efficiency of these nanostructures may benefit from the process of multiple exciton generation (MEG), whereby impact ionization can generate multiple electron-hole pairs from a single photon with an energy that is multiple times the band-gap energy of the semiconductor. It will be shown how terahertz (THz) time-domain spectroscopy (TTDS) can be used to study MEG in semiconductor QDs, both using a table-top source at the University of Manchester as well as ALICE's high-powered THz source. The synchronization of a laser to an external radiation source will be demonstrated with the example of laser-pump synchrotron-probe experiments at the SRS, with a view to synchronization at ALICE.