Analysis of Trap Distribution Using Time of Flight Spectroscopy

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Abstract

The current time transients for photoinjected charge transport in smectic liquid crystals are analyzed in the context of the multiple trapping model. It is shown that they obey universality in the Laplace domain, in the sense that the curves for different voltages are determined by a single function, A(s), which contains all the information concerning trapping and detrapping in the material. The density of trap energies is extracted for two different phases. It is shown that the trap density is consistent with a Gaussian distribution having a width 50meV at low fields ($E < 3$ kV/cm). A transition occurs at high fields $E > 3$ kV/cm above which a multiple trapping analysis is no longer applicable.

Biography

David Dunlap is an associate professor of physics at the University of New Mexico. His research is in the area of charge transport in molecularly doped polymers, investigating the origin of the field and temperature dependencies of the mobility. Other interests include the mechanisms for polaron formation and injection and space charge limited current in organic light emitting diodes, field-effect transistors, and in single molecular switches.