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Current focussing in organic semiconductors due to high local field, inhomogeneous trap distributions, and fibrous morphologies
KANOKKORN PIMCHAROEN, PHILLIP DUXBURY, Department of Physics and Astronomy, Michigan State University — Charge transport in organic devices is a key factor controlling device performance and as a means for characterizing devices. We have developed a fully three dimensional device simulation tool enabling treatment of inhomogeneous systems including c-AFM tip geometry, spatially varying trap distributions, and fibrous morphologies. The model and simulation procedures will be described and current focussing in three cases will be presented (i) high voltage at a c-AFM tip, (ii) inhomogeneous trap distributions and (iii) fibrous morphologies. Inhomogeneous trap distributions contribute to current focusing in both device and tip geometries and in both cases transport preferentially follow low trap pathways. In fibrous systems where the fibers have a low trap density, current flow concentrates on pathways where the low trap fibers occupy a higher fraction of the total path length.

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