

Abstract Submitted
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Negative Differential Resistance in CdSe Nanorod Devices.¹

HUGO ROMERO, DONG TRAN, GREGORY CALUSINE, MARIJA DRNDIC, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, Pennsylvania 19104 — Semiconductor quantum rods are expected to exhibit interesting novel behaviors because of their well-defined shape with the long axis preferably grown along the unique c axis. They would also allow for efficient quasi-1D electrical transport. Thus, when organized into arrays of aligned quantum rods separated by insulating barriers, improved and unconventional electronic transport could be achieved compared to that of “spherical” nanocrystal arrays. Here, we report on the observation of interesting charging properties in electronic devices consisting of CdSe quantum rod thick films as the active components. The low bias regime of the current-voltage characteristics of such devices displays multiple negative differential resistance behavior and step-like structures at room temperature. This effect may be related to the alignment of localized trap levels in the insulating barriers with the carrier levels in the quantum rods.

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