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Anomalous transmission through a periodic subwavelength hole array in heavily doped conducting polymer films* TATSUNOSUKE MATSUI, Z. VALY VARDENY, Physics Department, University of Utah, AMIT AGRAWAL, AJAY NAHATA, Department of Electrical and Computer Engineering, University of Utah, REGHU MENON, Department of Physics, Indian Institute of Science, PHYSICS DEPARTMENT, UNIVERSITY OF UTAH COLLABORATION, DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, UNIVERSITY OF UTAH COLLABORATION, DEPARTMENT OF PHYSICS, INDIAN INSTITUTE OF SCIENCE COLLABORATION — Since Ebbesen et al. reported the phenomenon of "anomalous transmission" through optically thick metallic films perforated with two-dimensional (2D) subwavelength hole array, numerous studies have been carried out to explore both fundamental issues and potential device applications. So far, studies on "anomalous transmission" were carried out using metals and semiconductors. We report here the observation of "anomalous transmission" in 2D hole array on films of another, more exotic class of conductors, namely heavily-doped organic conducting polymers. Specifically, the conductivity of conducting polymers can be controlled in situ by changing doping level using an electrochemical technique, so that we could tune the transmission characteristics by applied voltage. With this goal in mind we will report the "anomalous transmission" spectra of conducting polymer films at various doping levels. *supported in part by ARO.

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