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Extraordinary Tunneling through a Periodic Array of Quantum Dots[1] L.S. PETROSYAN, T.V. SHAHBAZYAN, Jackson State University — We study theoretically electron tunneling through a periodic system of quantum dots. We show that the coupling of dots via continuum of electronic states in the leads causes a strong enhancement, relative to the single-dot case, of the low-energy tail of resonant tunneling conductance when the Fermi wavelength in the leads is larger than system period. We calculated tunneling conductance for periodic one- and two-dimensional arrays of dots sandwiched between two- and three-dimensional leads and found that the enhancement factor can reach one and two orders of magnitude, respectively. The enhancement is accompanied by conductance oscillations as a function of gate voltage with maxima corresponding to the Fermi momentum in the leads being multiples of the reciprocal lattice constant. The predicted effect can be viewed as transport analogue of the extraordinary light transmission through periodic subwavelength hole array on metal film.

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