Electronic transport in a series of multiple arbitrary tunnel junctions

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Monte Carlo simulations and an analytical approach within the framework of a semiclassical model are presented which permit the determination of Coulomb blockade and single electron charging effects for multiple tunnel junctions coupled in series. The Coulomb gap in the I(V) curves can be expressed as a simple function of the capacitances in the series. Furthermore, the magnitude of the differential conductivity at current onset is calculated in terms of the model. The results are discussed with respect to the number of junctions.