

Temporal dynamics within linear arrays of Josephson junctions in the Coulomb blockade regime

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Recent experiments have studied the transport of individual charge carriers through a one-dimensional array of small Josephson junctions, in the limit of small Josephson coupling. Modern time resolved charge detection techniques allow the direct measurement of temporal correlations between these carriers.

We study such a system theoretical with the aim of understanding the transport properties within the array, in both the normal and superconducting regimes. Of particular interest are the effects of Coulomb repulsion between the carriers and the resulting correlations between charges as they are transported through the array. In studying such systems, a number of interesting mathematical and computational issues appear, as we require a theoretical model of a multi-particle system in which both coherent and incoherent dynamics play a role.