

Abstract Submitted  
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**Quantum Signal Transmission and Phenomenon of Superradiance**

AMIN TAYEBI, VLADIMIR ZELEVINSKY, Michigan State University — Electronic transport through one-dimensional periodic structures is investigated utilizing the method of effective non-Hermitian Hamiltonian based on the Feshbach projection formalism [1]. In an open system the internal states become resonances. At sufficiently strong coupling to the leads the resonances undergo a sharp redistribution of decay widths resulting in segregation of short-lived “superradiant” states and long-lived “trapped” states. The superradiant phase transition significantly enhances the transport through the structure [2, 3]. One of the advantages of the formalism is its flexibility which allows for a straightforward incorporation of extra elements (qubits), disorder and additional degrees of freedom, such as phonons. Numerical results of transport through different structures are presented.

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- [2] Y. S. Greenberg, C. Merrigan, A. Tayebi, and V. Zelevinsky, *Eur. Phys. J. B* **86**, 368 (2013).
- [3] A. Tayebi, and V. Zelevinsky, *AIP Conf. Proc.*, **1619**, 162 (2014).

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