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Quantum Transport and Emergence of Superradiant States AMIN TAYEBI, VLADIMIR ZELEVINSKY, Michigan State University — Quantum transport is investigated in the framework of the Feshbach projection formalism. This approach provides an alternative to popular methods such as the Feynman diagrammatic techniques and the master equation. The suggested method, being practically simpler, is quite general, not perturbative and reveals new physics, including the sharp redistribution of decay widths and the emergence of short-lived "superradiant" states and long-lived "trapped" states for sufficiently strong coupling to the leads. The superradiant states significantly enhance the transport phenomenon. An additional advantage of the formalism is its flexibility, which allows for a straightforward incorporation of disorder and additional degrees of freedom, such as phonons. Numerical results of transport through specific structures is presented. The interplay of superradiance and polaronic self-localization effects is discussed.

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