



Quantum Efficiency Seminar und Colloquium

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Generating particle-like scattering states in wave transport

We introduce a class of scattering states which display trajectory-like wave function patterns in wave transport through complex scatterers [1]. These deterministic scattering states feature the dual property of being eigenstates to the Wigner-Smith time-delay matrix and to the transmission matrix with classical (noiseless) transmission eigenvalues close to 0 or 1. An operational protocol for generating these states based on the scattering matrix is put forward and successfully tested numerically for regular, chaotic and disordered scattering landscapes. These results pave the way for the experimental realization of particle-like wave fronts in transport through complex media with possible applications like wave focusing and secure/low-power communication [2].

[1] S. Rotter, P. Ambichl, and F. Libisch, Phys. Rev. Lett. 106, 120602 (2011).

[2] D. Appell, Phys. Rev. Focus. 27, 13 (2011).

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