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【102】 Dynamic mesoscopic conductors: single electron sources, full counting statistics and thermal machines

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We theoretically investigate different aspects of dynamic mesoscopic conductors with the ultimate goal of contributing to the development of quantum technologies. Key results include: demonstrating that a single-electron partitioned at a beam-splitter is entangled and therefore possibly useful for quantum computation, developing a theory of joint electron waiting times and using it to describe single-electron excitations, shedding light on the non-classicality of negative values in the full counting statistics, proposing heat engines that rely on the wave-nature of electrons and on the particle-nature of photons, and proposing a refrigerator which exhibits coherence-enhanced cooling.

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