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Abstract:It is shown that the density matrix framework developed in the context of quantum cascade lasers can also be successfully used to compute the transport and gain in resonant tunnelling diodes. In particular, it is shown that the obstacle to raising the resonant frequency of resonant tunnelling diodes is set by the need to find high Q, singlemode resonators with electrical access. Conversely, achieving operation of quantum cascade lasers at high temperature and low frequency requires the design of injector structures with low absorption cutoffs.
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