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Dephasing in the semiclassical limit is system-dependent PHILIPPE JACQUOD, University of Arizona — We investigate dephasing in open ballistic chaotic systems in the limit of large system size to Fermi wavelength ratio, $L/\lambda_{\rm F} \gg 1$. Using the trajectory-based semiclassical theory, we calculate the weak localization correction $g^{\rm wl}$ to the conductance for a quantum dot coupled to (i) a dephasing voltage probe and (ii) an external closed quantum dot. In addition to the universal algebraic suppression $g^{\rm wl} \propto (1+\tau_{\rm D}/\tau_\phi)$ with the dwell time $\tau_{\rm D}$ through the cavity and the dephasing rate τ_ϕ^{-1}, we find an exponential suppression of weak localization by a factor $\propto \exp[-\tilde{\tau}/\tau_\phi]$, with a system-dependent $\tilde{\tau}$. In the dephasing probe model, $\tilde{\tau}$ coincides with the Ehrenfest time, $\tilde{\tau} \propto \ln[L/\lambda_{\rm F}]$, in both cases of perfectly and partially transparent dot-lead couplings. In contrast, when dephasing occurs due to the coupling to an external dot, $\tilde{\tau} \propto \ln[L/\xi]$ depends on the correlation length ξ of the coupling potential instead of $\lambda_{\rm F}$.

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