Abstract Submitted
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Rings and boxes in dissipative environments BARUCH HOROVITZ, Ben-Gurion University, Israel — We study a particle on a ring in presence of a dissipative Caldeira-Leggett environment and derive its response to a DC field [1]. We find, through a 2-loop renormalization group analysis, that a large dissipation parameter η flows to a fixed point $\eta^R = \hbar/2\pi$. We also reexamine the mapping of this problem to that of the Coulomb box and show that the relaxation resistance, of recent interest, has a certain average that is quantized for $\eta > \eta^R$, leading to quantized noise. We propose a box experiment to detect this noise. When the particle carries a spin with spin-orbit interactions [2] we find that the spin correlations in the direction perpendicular to the ring are finite at long times, i.e. do not dephase, while the parallel components may decay as a power law at strong dissipation.

[1] Y. Etzioni, B. Horovitz and P. Le Doussal, Phys. Rev. Lett. **106**, 166803 (2011).
[2] G. Zaránd, G. T. Zimányi and F. Wilhelm, Phys. Rev. B**62**, 8137 (2000).

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