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Nonlinear σ -model for a ballistic quantum dot with random boundary absorption IGOR ROZHKOV, GANPATHY MURTHY, Department of Physics and Astronomy, University of Kentucky — The problem of evaluation of a two-point function in an integrable ballistic billiard (circular quantum dot) is formulated in terms of the supersymmetric nonlinear σ -model. The dot is assumed to be slightly open. It is modeled by attaching the closed circular billiard to the leads with random coupling constants between the eigenstates of the dot and the outgoing states. In the limit of large number of uniformly distributed leads with an infinitesimal couplings to a single channel in each lead we are able to derive a nonlinear σ for interacting angular harmonics of the supersymmetric field. Our procedure is done within saddle point approximation without introduction of a disorder potential or diffusive boundary scattering; no energy averaging was performed. Supported by: NSF DMR 0311761 [1]B. A. Muzikantskii and D. E. Khmelnitskii, JETP Lett. 62, 76 (1995). [2] A. V. Andreev, O. Agam, B. D. Simons, and B. L. Altshuler, Phys. Rev. Lett. 76, 3947 (1996). [3] K. B. Efetov and V. R. Kogan, Phys. Rev. B 67, 245312 (2003).

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