

Abstract Submitted  
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**Fractal conductance fluctuations of classical origin** HOLGER HENNIG, RAGNAR FLEISCHMANN, MPIDS, Goettingen and University of Goettingen, Germany, LARS HUFNAGEL, Kavli Institute for Theoretical Physics, UCSB, USA, THEO GEISEL, MPIDS, Goettingen and University of Goettingen, Germany — The coherent conductance through mesoscopic structures is well known to show reproducible fluctuations with the variation of an external parameter (e.g. a magnetic field). These fluctuations are caused by interference effects and can be described semiclassically. In systems with mixed (regular and chaotic) classical dynamics *fractal* conductance curves are found<sup>1</sup>. Experiments that study the transition from coherent to incoherent transport showing a change of the fractal dimension with the coherence-length<sup>2</sup>, however, seemed to contradict the semiclassical theory of the fractal scaling. We show that there is no contradiction but that the classical dynamics itself already leads to fractal conductance curves<sup>3</sup> explaining the experimental observations. Moreover, we predict fractal classical conductance fluctuations not only in systems with mixed phase space but in purely chaotic systems.

<sup>1</sup>R. Ketzmerick, *Phys. Rev. B* **54**, 10841 (1996)

<sup>2</sup>A.P. Micolich et al., *Phys. Rev. Lett.* **87**, 036802 (2001)

<sup>3</sup>H. Hennig, R. Fleischmann, L. Hufnagel and T. Geisel, *Phys. Rev. E* **76**, 015202 (2007)

Holger Hennig  
MPIDS, Goettingen and University of Goettingen, Germany

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