

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

What Is Measured in the Scanning Gate Microscopy of a Quantum Point Contact? STEVEN TOMSOVIC, Department of Physics and Astronomy, P.O. Box 642814, Washington State University, Pullman, WA 99164-2814, USA, RODOLFO A. JALABERT, WOJCIECH SZEWC, DIETMAR WEINMANN, Institut de Physique et Chimie des Matériaux de Strasbourg, UMR 7504, CNRS-UdS, 23 rue du Loess, B.P. 43, 67034 Strasbourg Cedex 2, France — The conductance change due to a local perturbation in a phase-coherent nanostructure is calculated. The general expressions to first and second order in the perturbation are applied to the scanning gate microscopy of a two-dimensional electron gas containing a quantum point contact. The first-order correction depends on two scattering states with electrons incoming from opposite leads and is suppressed on a conductance plateau; it is significant in the step regions. On the plateaus, the dominant second-order term likewise depends on scattering states incoming from both sides. It is always negative, exhibits fringes, and has a spatial decay consistent with experiments.

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Date submitted: 26 Nov 2012

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