Theory of scanning gate microscopy

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The conductance change due to a local perturbation in a phase-coherent nanostructure is calculated [1]. 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 relation between the conductance change and the local current density is discussed relying on an extension of the Szafer-Stone model for a constriction [2].

[1] R. A. Jalabert, W. Szewc, S. Tomsovic and D. Weinmann, *What is measured in the scanning gate microscopy of a quantum point contact?* Phys. Rev. Lett. **105** 166802 (2010)
[2] A. Szafer and A. D. Stone, *Theory of Quantum Conduction through a Constriction* Phys. Rev. Lett. **62** 300 (1989)