**Photovoltaic characterization of semiconductors with STM.**

Hagen T, Grafstrom S, Kowalski J, Neumann R
*Applied Physics A-Materials Science & Processing Volume: 66 (1998) 973-976*

Surface photovoltage (SPV) provides information on the electronic structure of semiconductor surfaces. Several schemes for measuring SPV with the STM have been realized in the past, using both continuous and modulated illumination. In the latter case the signal also contains contributions due to thermal expansion and tip-sample stray capacitance. For measurements on metal-like surfaces such as Si(111)-(7x7) we apply a potentiometric method: the conductivity dI/dV is used for distance control, while a second feedback loop adjusts the bias voltage for zero DC current, thus providing a direct measure of the SPV. Topography and SPV are imaged simultaneously and continuously. We present data obtained with this method as well as an experimental analysis of the competing effects observed under modulated illumination.