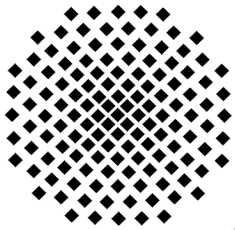
Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme*

Ansprechpartner: Prof. Harald Giessen
E-Mail: giessen@physik.uni-stuttgart.de
Telefon: 0711 - 685-65111



Dienstag, 8. November 2011	17:15 Uhr	Hörsaal V 57.01

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

Gastgeber: Prof. Christian Holm, Universität Stuttgart, Telefon: 0711 - 685-63701

Electrochemical nanofluidics: Mesoscopic and single-molecule limits

Serge G. Lemay
University of Twente

Abstract

There is broad technological interest in developing massively parallel biochemical assays based on silicon technology. Still missing, however, are suitable transduction mechanisms for converting chemical information about the contents of a liquid sample directly into electrical signals. I will first review the main approaches currently being pursued before focusing on the electrochemical nanofluidic devices being developed in my group. These consist of a pair of electrodes imbedded in a nanochannel; molecules undergoing Brownian motion in the channel act as electron shuttles, greatly amplifying their electrochemical signature. Because of the tiny volumes involved, equilibrium statistical fluctuations in the number of molecules present inside the devices can be observed with the “naked eye” as electrical noise. We have recently managed to push this principle to its ultimate limit, namely, the stochastic detection of single molecules.

*ehemals Max-Planck-Institut für Metallforschung