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S E M I N A R

aus

Halbleiterphysik und Nanotechnologie

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Hörsaal für Physik

"Si and Ge nanowires as building blocks for novel devices"

Ass. Prof. Dr. Alois Lugstein
Institut für Festkörperelektronik der TU Wien

In order to continue the Moore's law new material for electronic components is been developed. Nanowire has been tested to have novel properties for application in electronic devices which will provide application in computer electronics.
The purpose of the presentation is to illuminate several aspects regarding the synthesis of silicon and germanium nanowires, their electrical properties, and the fabrication of a first device made thereof. Following an introductory survey of nanowire growth methods, experimental results concerning the epitaxial growth of nanowires are presented. The diameter dependence of the nanowire growth velocity and crystallographic growth direction of nanowires, a parameter that is of great importance especially in view of the technical applicability of epitaxially grown nanowires will be discussed. After these partially theoretical considerations with regard to the nanowire morphology, the electrical and optical properties of nanowires will be shown.
Having electronic applications of nanowires in mind, the fabrication of a nanowire field-effect transistor is naturally the first step. The feasibility of the fabrication process and the basic functionality of nanowire based devices such as gate all around FETs or "straintronic" devices will be demonstrated.