2. FWF SFB IR-ON Symposium:

InfraRed Optical Nanostructures

10. März 2011, TU Wien, Gusshausstr. 27-29, Seminarraum E387, 1040 Wien

The need for environmental sensing, fast trace gas detection, control of hazardous material, pollution control is of critical importance to the modern industrial society. Our quality of life, safety and environmental legacy are all directly affected by the chemical environment we live in and leave behind. Recent geopolitical events have created a demand for new security systems. The optical absorption lines of many important chemical compounds (drugs, explosives and hazardous chemicals) fall into the infrared spectral region (2-20µm). To solve this real world, macro-scale problem, namely the shortage of photonic devices for the infrared wavelength range, we utilize nanostructures, to make significant advances in the understanding and development of future devices.

The realization of semiconductor nanostructures in particular of quantum dots formed by self-organization offers fascinating perspectives both for fundamental physics and for the development of new electronic and photonic devices. Since semiconductor quantum dots resemble "artificial" atoms, their apparent quantum nature can be combined with advantages of the "classical" semiconductor world. In this way these ensembles of semiconductor atoms can be contacted with wires, integrated in circuits and built with high integration. The confinement to the nanometer scale leads to quantized energy levels with energy differences corresponding to the infrared spectral region. Nanostructuring of semiconductors adds new functionality -- infrared optical activity. The goal of the joint effort IR-ON is to investigate, understand, and make use of this infrared optical activity which is entirely determined by quantum size effects. Since the infrared properties are determined by quantum effects and not by material parameters alone we try to give optical activity to a variety of materials including Silicon by using Silicon/Germanium nanostructures - eventually giving future high integrated circuits optical sensing capabilities.

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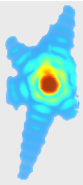

2. IR-ON Symposium

Thursday, March 10th 2011

10:45	Welcome
11:05	**Hans von Känel** *(ETH Zürich, Laboratorium f. Festkörperphysik)* **SiGe / Si heteroepitaxy: From layers to three-dimensional crystals**
11:55	**Stefan Rotter** *(TU Wien, Institut für Theoretische Physik)* **Introducing a self-consistent laser theory: first results and perspectives**
12:45	Lunch break (1h 30min)
14:15	**Marcel Rattunde** *(Fraunhofer Institute for Applied Solid State Physics)* **GaSb-based Semiconductor Disk Lasers for the 2 – 3 µm wavelength range**
15:05	**Wolfgang Heiss** *(Johannes Kepler University Linz, Institute of Semiconductor and Solid State Physics)* **Nanocrystals for infrared applications and for self-assembly**
15:55	Coffee break (30min)
16:25	**Harald Schneider** (Helmholtz-Zentrum Dresden-Rossendorf Institute of Ion-Beam Physics and Materials Research) **Nonlinear terahertz spectroscopy of semiconductor quantum structures**
17:15	**Gottfried Strasser** (TU Wien, Institut für Festkörperelektronik) **InGaAs / GaAsSb infrared devices**
18:05	Closing

FWF Der Wissenschaftsfonds.

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