



FWF SFB INFRARED OPTICAL NANOSTRUCTURES

IR-ON SEMINAR

ZnO nanowires for photonic applications

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Semiconductor nanowires are of major importance within the area of nanotechnology, and are usually synthesized using the vapor-liquid-solid (VLS) mechanism. They serve as both functional units as well as the wires that access them; therefore, they are ideal building blocks for functional nanoscale devices. Applications and proto-type devices based on semiconductor nanowires have been realized in various areas: in electronics, photonics, mechanics, and sensors. I will summarize and focus my presentation on the use of zinc oxide nanowires for photonic applications: this will include waveguiding [1], light emitting diodes [2], and lasers [3].

I will finish the seminar on controlled doping of semiconductor nanowires, which is a necessary issue in order to make full use of them as devices. However, this is an unsolved problem and an extremely difficult task if using the VLS growth mechanism. We use an alternative route for modifying the electrical, optical and magnetic properties of semiconductor nanowires: ion implantation. One example on optical doping of ZnO nanowires will be presented.

Host: A. Lugstein

[1] High order waveguiding modes in ZnO nanowires, T. Voss, G.T. Svacha, E. Mazur, S. Müller, C. Ronning, D. Konjhodzic, F. Marlow, Nano Letters 7 (2007) 3675

[2] Scalable fabrication of nanowire photonic and electronic circuits using spin-on glass, M. Zimmler, F. Capasso, D. Stichtenoth, C. Ronning, W. Yei, V. Narayanamurti, T. Voss, Nano Letters 8 (2008) 1695

[3] Laser action in nanowires: Observation of the transition from amplified spontaneous emission to laser oscillation, M. Zimmler, J. Bao, F. Capasso, S. Müller, C. Ronning, Appl. Phys. Lett 93 (2008) 051101

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