



Agilent Technologies

Sept. 2010

PhD Thesis

CD-lab of Nanoscopic Methods in Biophysics: Scanning Microwave Microscopy Applications

Joint project with Agilent Technologies Inc.

General description: Agilent Technologies offers high-precision, modular AFM solutions for research, industry, and education. The Scanning Microwave Microscope (SMM; image lower left) mode is a new scanning probe microscope that combines the power of Agilent AFMs with Agilent's 40-year legacy of excellence to deliver new standards in speed, accuracy, and versatility for microwave network analysis.

Diploma thesis: Novel instrumentation and tools for nanoscale microwave technology and research are developed. This includes research on high performance vector network analyzer (VNA; image lower right shows Smith chart and network modeling) and novel technology for scanning probe microscopy, as well as application to life science and materials science. This project focuses on nanoscale microwave technologies and related emerging applications in the semiconductor and life science sectors, specifically, in nano-electronics, nano-spintronics, nano-biology and nano-medicine. Based on the scanning microwave microscope (SMM) we develop advanced measuring instrumentation, tools and techniques to establish entirely new nanoscale measurement modes.

Purpose of the Work: The task requires research to be performed at the level of electronic hardware of microwave generation and detection (e.g. high performance non-linear network analyzers) and at the level of scanning probe microwave techniques (e.g. developments of novel scanning modes). In the latter case, adaptations will be performed to the SMM to enable work in quite diverse applications such as spintronics (including high magnetic fields), semiconductors (external electrical grounding), and biological samples (liquid environment of living cells).

Requirements: Technical study (Physics, Electronics, Mechatronics). Diploma thesis in general measurement technology (e.g. high frequency technology, microwave technology, PNA network analysis, materials science). The thesis is paid according to FWF rules.

Contact: Prof. Dr. Peter Hinterdorfer, JKU Linz, Biophysik Institut, Altenbergerstrasse 69, 4040 Linz: peter.hinterdorfer@jku.at; Tel.: 0732-2468-9265; Dr. Ferry Kienberger, Agilent Technologies Oesterreich GmbH, Aubrunnerweg 11, 4040 Linz. E-mail: ferry_kienberger@agilent.com; Tel.: 0732-2468-1526

