Name of the Partnering Organization:	**Experimental Physics III, Uni Würzburg**
Location (town, country):	Würzburg - Germany
Web site address:	http://www.physik.uni-wuerzburg.de/EP3/

Brief description of the organization

The Institute of Physics of the University of Würzburg, Germany, is a large education and research facility (ca. 200 scientists, 700 students), which has a focused effort on solid state physics and nanotechnology. It is comprised of 7 chairs of experimental physics, one chair of technical physics, and one chair of physics didactics. It is part of the faculty of physics and astronomy, which also includes the institute of theoretical physics and astronomy, itself comprised of 4 research chair, two of which have directed efforts in solid state physics. Infrastructure including more than a dozen MBE reactors for a wide range of materials, a large nanostructure laboratory including multiple clean room facilities, and fully equipped processing lines (e-beam, focused ion beam) are available, along with full characterization and imagine facilities in almost all aspects of solid states physics. This is supplemented by various groups working on the physics of semiconductor surfaces, transport physics, and the development of optoelectronic devices etc. The department of Prof. Molenkamp (~70 researchers is concentrating on quantum transport phenomena, magnetoelectronics and spintronics, and the properties of magnetic semiconductors. These activities are supplemented by MBE facilities for the growth of magnetic III-V and II-VI materials, including a variety of relevant characterisation techniques for optical, structural and electrical investigations.

Description of the research group

The Chair of Experimental Physics III is, since 1999, headed by Prof. L. W. Molenkamp, and comprises of an MBE unit (a 7 chamber cluster plus several stand-alone chambers), a full lithography unit (clean room with complete process line for optical and e-beam lithography, sub 10nm resolution and large are capabilities), an a characterization team which runs upwards of 15 cryostats, including 3 dilution refrigerators, as well full transport, optical and magnetic characterization facilities. The group has long been considered a field leader in materials growth, spintronics and quantum transport, and more recently in topological electronics. Since 1999, the chair has produced approximately 250 peer reviewed publications, cited well over 6000 times, and which would produce an H-index of about 33 if the definition was applied to the group. The group consists of over 70 members, including 4 full professors, 6 senior post-doctoral / assistant level staff, each specializing in one of the areas of expertise: Growth, Lithography, Transport, optics, etc, and currently over 60 graduate students (Roughly half at the PhD level.)

Selected list of relevant publications

Injection and detection of a spin-polarized current in a light-emitting diode, Fiederling R et al., NATURE 402,787-790, (1999)

Quantum spin hall insulator state in HgTe quantum wells, Koenig M. et al., SCIENCE 318, 766 (2007).

Tunneling anisotropic magnetoresistance: A spin-valve-like tunnel magnetoresistance using a single magnetic layer, Gould C et al., Phys. Rev. Lett. 93, 117203 (2004).

Nonlocal Transport in the Quantum Spin Hall State, Roth A. et al., SCIENCE 325, 294 (2009)

Key researcher's CV

Charles Gould -Senior Research Assistant **–**Private Dozent.

90 papers in peer reviewed journals, cited over 1800 times, 2 invited reviews, one book chapter and 5 U.S. Patents fillings. More than 30 invited talks at International Congresses, Conferences, Symposia. He has been working in the fields of quantum transport and spintronics since his graduate work at the National Research Council of Canada, where he graduates (in a cooperation with University of Sherbrooke) in 1999. Since 2000, he has been a member of the spintronics team at EP3, and has managed the group for the last 4 years. He currently oversees the activities of 18 graduate students working on this effort. His specialization is in transport phenomena and cryogenic physics, but he also has expertise in magnetic characterization. The spintronics effort also is very reliant on growth and lithography work, which he also oversees, but where he relies on two other researchers key to this exchange, to provide more detailed expertise. Dr. C. Schumacher and Dr. T. Borzenko, who are senior research assistants specializing in MBE methods and nano lithography respectively.