

Radovan Urban

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Education

1997 - 2003 : Ph.D. in Physics, Simon Fraser University, Burnaby, Canada
(Prof. B. Heinrich)

- Thesis : *Electron tunneling and spin dynamics and transport in crystalline magnetic multilayers*

1992 - 1997 : B.Sc. and M.Sc. in Physics, Charles University, Prague, Czech Republic
(Prof. Š. Višňovský)

- Thesis (in Czech) : *Magneto-optical polar Kerr effect in Au/Co structures at oblique angle of incidence*

Areas of research

Magnetic and transport properties of magnetic multilayers and metal-insulator structures grown by Molecular Beam Epitaxy (MBE). The main experimental tools are Magneto-optical Kerr Effect (MOKE), Ferromagnetic Resonance (FMR), and Ferromagnetic Resonance Force Microscopy (FM-RFM). The studied samples include M/Fe multilayers (M = Cr, Cu, Au, Pd) grown directly on GaAs(001) and Fe/MgO tunnel junctions grown on Fe whisker(001).

- **Ferromagnetic resonance force microscopy (FMRFM)** of micron-size YIG-samples
- **Semiclassical theory of non-local spin transport** based on Landau-Lifshitz and diffusion equations in magnetic multilayers
- **Magnetic relaxations by non-local spin transport** (dynamic exchange interaction) in Fe/Au and Fe/Au/Fe ultrathin magnetic structures prepared on GaAs(001) by MBE studied by FMR
- **Induced magnetocrystalline anisotropies** in thin Fe films grown directly on (4 × 6) reconstructed GaAs(001)
- **Two-magnon scattering** in Fe/Cr structures studied by in-plane and out-of-plane FMR in the frequency range between 10 - 36 GHz
- **Domain wall induced switching** in Fe/MgO/Fe whisker(001) tunnel junctions studied by high sensitivity MOKE microscope
- Growth, structure, and electron transport in **crystalline Fe/MgO/Fe tunnel junctions** studied by RHEED, LEED, UPS, STM, and AFM
- **Temperature dependance of CIP-GMR** in Fe/Cu/Fe and Fe/Au/Fe structures grown directly on GaAs(001)
- **High precision MOKE spectroscopy** in wide spectral range using polar and longitudinal configuration at the general angle of incidence
- **Modelling of the MO response** in magnetic thin films using Maxwell's equations and Yeh's 4 × 4 matrix formalism

Professional experience

- **McGill University, Montréal** : Measuring tunneling I-V characteristics of Fe/MgO/Fe whisker junctions using AFM (March 2002)
- **Max-Planck-Institute, Halle, Germany** : In-situ AFM and STM studies of Fe/MgO/Fe structures prepared by MBE and Laser Ablation (April - June, 2001 and March - August, 2000)
- **Institute for Solid State Physics, Dresden, Germany** : Study of the interlayer exchange coupling of Fe/MgO/Fe whisker samples using MOKE microscopy (May 2001)
- **INSA Toulouse, France** : Dynamical MOKE in polar and longitudinal configuration on Au/Co/Au structures (May - June, 1994)

Awards

- 1st place in Milan Odehnal Award for Young Physicists, Czech Society of Mathematicians and Physicists, *Mystery of negative damping (invited)*, Czech Republic, Sept. 2002
- 2nd place in Student Competition at 4th International Symposium on Metallic Multilayers (MML'01), Aachen, Germany, *Non-local Gilbert damping in the magnetic multilayers and two-magnon scattering in ultrathin films* by R. Urban, G. Woltersdorf, and B. Heinrich
- Laureate of Bolzano's Award, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic

Selected publications

Total 26 publications in refereed journals

- R. Urban, B. Heinrich, and G. Woltersdorf, *Semiclassical theory of spin transport in magnetic multilayers*, J. Appl. Phys. **93**, 8280 (2003)
- B. Heinrich, Y. Tserkovnyak, G. Woltersdorf, A. Brataas, R. Urban, and G.E.W. Bauer, *Dynamic exchange coupling in magnetic bilayers*, Phys. Rev. Lett. **90**, 187601 (2003)
- R. Schäfer, R. Urban, D. Ullmann, H.L. Meyerheim, B. Heinrich, and J. Kirschner, *Domain wall-induced switching of whisker-based tunnel junctions*, Phys. Rev. B **65**, 144405 (2002)
- R. Urban, B. Heinrich, G. Woltersdorf, K. Adjari, K. Myrtle, J.F. Cochran, and E. Rozenberg, *Nano-second relaxation processes in ultrathin metallic films prepared by MBE*, Phys. Rev. B, Rapid Communications **65**, 0402 (2002)
- R. Urban, G. Woltersdorf, and B. Heinrich, *Gilbert damping in single and multilayer ultrathin films. Role of interfaces in non-local spin dynamics*, Phys. Rev. Lett. **87**, 217204 (2001)
- M. Klaua, D. Ullmann, J. Barthel, W. Wulfhekel, J. Kirschner, R. Urban, T.L. Monchesky, A. Enders, J.F. Cochran, B. Heinrich, *Growth, structure, electronic and magnetic properties of MgO/Fe(001) bilayers and Fe/MgO/Fe(001) trilayers*, Phys. Rev. B **64**, 134411 (2001)
- A. Enders, T.L. Monchesky, K. Myrtle, R. Urban, B. Heinrich, J. Kirschner, X.-G. Zhang, and W.H. Butler, *The role of interfaces in the magnetoresistance of Au/Fe/Au/Fe/GaAs(001)*, J. Appl. Phys. **89**, 7110 (2001)
- W. Wulfhekel, M. Klaua, D. Ullmann, F. Zavaliche, J. Kirschner, R. Urban, T.L. Monchesky, and B. Heinrich, *Single-crystal magnetotunnel junctions*, Appl. Phys. Letters **78**, 509 (2001)

- R. Urban, M. Nývlt, Š. Višnovský, J. Ferré, D. Renard, M. Galtier, and P. Beauvillain
Effect of roughness on the interface contribution to polar Kerr effect in Au/Co ultrathin film structures, J. Magn. Soc. Jpn. **22**, 197-200 (1998)