

Tomáš Tyc

Personal data

- Tomáš Tyc, born in 1973 in Brno, Czechoslovakia
- Married

Work

- Institute of Theoretical Physics and Astrophysics, Masaryk University, Brno, Czechia; position: professor
- Institute of Scientific Instruments of the CAS, v. v. i., Brno, Czechia; position: key scientist

Education and academic career

- 2009: professor, Theoretical Physics and Astrophysics, Masaryk University
- 2006: habilitation, Theoretical Physics and Astrophysics, Masaryk University; habilitation thesis *Three problems from quantum optics*
- 1999: Ph.D., Theoretical Physics and Astrophysics, Masaryk University; doctoral thesis *More-particle correlations in fermion beams*

Academic stays (selection):

- University of Dundee, Scotland, Prof. Tomáš Čížmár; 5 weeks in 2013, 4 weeks in 2014.
- University of St Andrews, Scotland, Prof. Ulf Leonhardt; 6 months in 2007, 4 months in 2008, 3 months in 2010, 3 months in 2011, 2 months in 2012.
- University of Calgary, Canada, Department of Physics and Astronomy, Prof. Barry Sanders; 3 months in 2004
- Macquarie University Sydney, Australia, Department of Physics, Prof. Barry Sanders; 5 months in 2001 and 5 months in 2002
- Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria, one month in 2000
- University of Vienna, Austria, Institut für Experimentalphysik, Prof. A. Zeilinger, 4 months in 2000
- University of Tübingen, Germany, Institut für Angewandte Physik, Priv. Doz. Franz Hasselbach, five stays of 11 months in total in 1996 – 1999

Research interests

- Imaging by optical fibres
- Theory of absolute instruments and perfect imaging devices
- Transformation optics and its applications in the theory of invisibility
- Applications of non-Euclidean geometry in optics

Selected publications

- T. Tyc, A. J. Danner, *Absolute optical instruments, classical superintegrability, and separability of the Hamilton-Jacobi equation*, Physical Review A 96, 053838 (2017).

- M. Plöschner, T. Tyc, T. Čižmár, *Seeing through chaos in multimode fibres*, Nature Photonics 9, 529 (2015).
- T. Tyc, *Gouy phase for full-aperture spherical and cylindrical waves*, Optics Letters 37, 924 (2012).
- T. Tyc, X. Zhang, *Forum Optics: Perfect lenses in focus*, Nature 480, 42 (2011).
- T. Tyc, L. Herzánová, M. Šarbort, K. Bering, *Absolute instruments and perfect imaging in geometrical optics*, New Journal of Physics 13, 115004 (2011).
- A. Danner, T. Tyc, U. Leonhardt, *Controlling birefringence in dielectrics*, Nature Photonics 5, 357 (2011).
- Y. G. Ma, C. K. Ong, T. Tyc, U. Leonhardt, *An omnidirectional retroreflector based on the transmutation of dielectric singularities*, Nature Materials 8, 639 (2009).
- U. Leonhardt, T. Tyc, *Broadband Invisibility by Non-Euclidean Cloaking*, Science 323, 110 (2009).

Pedagogical activities

- Teaching lectures and tutorials (Theoretical mechanics, Introduction to Quantum Mechanics, Interesting Physics, Interesting theoretical physics, Modern experimental methods, Introduction to the theory of absolute instruments and invisible cloaks)
- Supervising PhD, diploma and bachelor students

Science popularization activities (selection)

- TV series for children *Já budu Einsteinem* popularising physics, Czech television, 25 parts of 30 minutes each.
- Co-author of presentation stand *Invisibility science* at Summer Science Exhibition, Royal Society, London, 2011
- *Physics as Adventure* – a series of 10 physics shows in Brno planetarium, 2005 – 2007
- *Physics of the everyday life* – physics show at IOP Festival of Physics, Bristol, UK, 2010
- *Unusual Phenomena of a Usual Day* – lecture at School of Physics and Astronomy, University of St Andrews, UK, 2010
- *Physics of the everyday life* – physics show at the conference Metamaterials'10 in Karlsruhe, Germany, 2010
- *Physics of everyday life* – physics show at School of Physics and Astronomy, University of St Andrews, UK, 2008
- *Engineering invisibility cloaks, black holes and superantennas with optical fibres* – lecture at BA Festival of Science, Liverpool, UK, 2008
- *Interesting Physics* – series of lectures, Macquarie University, Sydney, Australia, 2002
- Unusual phenomena of a usual day – photographs of beautiful physics phenomena with their short descriptions, available at <http://zajfyz.physics.muni.cz/en>