CURRICULUM VITAE

Name: **KAMIL TOKÁR**
e-mail: kamil.tokar@savba.sk
Date of birth: 3. 7. 1973 (Prešov, SK)

EDUCATION

2008 – 2011 PhD. in physics

Institute of Nuclear Physics
Polish Academy of Sciences (PAN), Poland
Department of Material Research by Computers – MRC, Cracow, Poland
PhD. degree – Condensed matter physics (Dec 2011)
Thesis: *"Magnesium orthosilicate – high pressure properties and phase diagram from first principles"*
Supervisor: prof. dr hab. Krzysztof Parliński
Consultants: dr hab. Paweł T. Jochym, dr hab. Przemysław Piekarz
Collaboration: prof. dr hab. A.M. Oleś, Jagiellonian University, Kraków, Poland

2000 RNDr. degree in physics

Comenius University in Bratislava, SK
Faculty of Mathematics, Physics and Informatics
Doctoral thesis: in theoretical a mathematical physics (**RNDr.**)
Topic*: "Potlačenie produkcie J/psi mezonov v zrážkach Pb-Pb ťažkých iónov"*
Supervisor: prof. RNDr. Ján Pišút, DrSc.

1991 – 1996 M.Sc. in physics

Comenius University in Bratislava, SK
Faculty of Mathematics, Physics and Informatics
Theoretical a mathematical physics
Diploma thesis: *"Presne riešiteľný Jaynes-Cummingsov model s neabelovskou kalibračnou symetriou"*
Supervisor: prof. Ing. Milan Noga, DrSc.

EMPLOYMENT HISTORY

2013 – present

Institute of Physics SAS, Bratislava, SK

Researcher
Quantum mechanical DFT methods and quantum Monte Carlo QMC applied to many-body correlated systems

2020 – present

Faculty of materials science and technology MTF STU in Bratislava, Trnava, SK

Research scientist
Prediction of new anorganic phases in metal halides and oxides by **DFT** methods in conjunction with evolutionary algorithms **EA**

2011 – 2013	**University of Warsaw, Poland** **Institute of theoretical physics (found by L. Infeld)** **Department of Physics (Wydzial Fizyki, UW), Warsaw** **Scientific adjunct + project research specialist** **Research project:** Epitaxy and growth of graphene on SiC surfaces by CVD deposition simulated in DFT approach
2008 – 2011	**Institute of Nuclear Physics** **Polish Academy of Sciences (PAN), Poland** **Department of Material Research by Computers – MRC, Cracow, Poland** **Researcher on Maria Curie c2c project** Participation in **Maria Curie "c2c" network** project led by Bavarian Research Institute of Experimental Geochemistry and Geophysics (BGI), University of Bayreuth, Germany
2007 – 2008	**Slovak University of Technology in Bratislava** **Faculty of Electrical Engineering and Information Techology - FEI STU** **Department of Physics** **Basic physics courses - teaching and research** Member of Center for Computational Materials Science group (CCMS) **Research:** Multiscale simulations of quantum-mechanical systems by ab initio and quantum Monte Carlo (QMC) methods
2003 – 2007	**Commerce SW development in IT companies(Bratislava,SK)** Programming, analytical work and development of applications
1996 - 2003	**Comenius University in Bratislava** **Faculty of Mathematics, Physics and Informatics (FMFI UK)** **Research:** Elementary particles physic s– phenomenology of heavy ions collisions Pb-Pb, perturbation quantum chromodynamics (**QCD**, Standard model). Production of heavy **J/\psi** mesons and suppression in the intermediate gluons system

SCIENTIFIC INTERESTS

Condensed matter physics and solid state physics – computer physics

- Prediction and search of new anorganic crystalline phases by evolutionary algorithms **EA**
- Molecular dynamics (**Car-Parrinello, Born-Oppenheimer approach, thermostats**) – numerical simulations of molecular interactions on the surfaces and in nanostructures

- **Quantum Monte Carlo (QMC-VMC, DMC)** methods applied in clusters, **P, B** -doped **Si** nanocrystals and **2D** layered materials (**phosphorene, MoS2**)
- Application of quantum **DFT** methods in correlated electronic structure of crystals
- Prediction of crystals elasticity by **DFT**
- Lattice dynamics and mechanical stability of crystal structures (**2D - phosphorene**, **MoS2**)
- Phonon system of **2D** a **3D** materials from **DFT (DFPT)**
- Modeling of optical **IR** and non-resonant **Raman** spectra intensities
- Prediction of thermodynamic properties of crystal bodies in quasi-harmonical approximation (**QHA**) from *ab* initio
- Phase transitions and stability, phase diagrams

Theoretical high energy physics (< 2004)

- Calibration theories in quantum field theory and their formulations on the lattice
- Perturbation quantum chromodynamics **QCD** in case of gluon cascade by heavy ions collisions
- Phenomenology of **J/\psi mesons** production and its suppression in central collisions of heavy **Pb-Pb ions (CERN collaboration)**
- Modeling of space-time evolution of intermediate gluons system in nucleon-nucleon collisions
- Equibrium descriptions and thermodynamical approximations of quark-gluon gases and plasma systems

SKILS AND INTERESTS

Language skills:

English (spoken fluently), **Polish** (spoken fluently, writing), **German** (passive), **Russian** (passive, reading)

Programming and tools:

Languages: C/C++, Fortran, MS VBA scripting, Linux – B shell, C shell scripting environments, awk, gawk, Python

Program packages: VASP, Phonon, Phonopy, Siesta, Quantum espresso, Crystal09-14, Gamess US, CPMD, Gaussian, cp2k, XtalOpt 12, Wannier90, XtalOpt, Calypso, LaTex

OS (operational systems): Linux, MS Windows, VMS, Mac OS

Personal interests:

Mathematics in history, astrophysics, cosmology, literature, music, theatre, cinema, general history, mountain hiking, water sports, travelling