Petr Grigorev | Computational Physicist

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Education

Ghent University/Complutense University of Madrid **Ghent/Madrid**
Ph.D. in Engineering Physics *2012–2017*
International Doctoral College in Fusion Science and Engineering (FUSION-DC)

Peter the Great St.Petersburg Polytechnic University **Saint-Petersburg**
Master in Physics, GPA 5.0 out of 5.0 *2010–2012*
Specialization in Nuclear and Elementary Particle Physics

Peter the Great St.Petersburg Polytechnic University **Saint-Petersburg**
Bachelor in Physics, GPA 4.4 out of 5.0 *2006–2010*
Department of Nuclear Physics

Ph.D. thesis

title: *Assessment of retention of plasma components in tungsten under high flux plasma exposure: multi-scale modelling approach*

supervisors: Dr. Dmitry Terentyev, Dr. Christophe Ortiz

date of the defence: 27 April 2017

description: A new physical model of dislocation mediated H retention in tungsten under fusion relevant plasma exposure conditions was proposed. A Rate Theory simulation tool was developed and validated by comparison with experimental results available in literature.

Master thesis

title: *Molecular dynamics study of sputtering of Al, Si and SiC surfaces and nanoclusters by monoatomic and nanocluster beams*

supervisor: Dr. Evgeny E. Zhurkin

Experience

Research

Warwick Centre for Predictive Modelling **Coventry**
Research Fellow *2017–present*
Development and application of a set of atomistic materials modelling methods:
- Hybrid quantum/classical methods to study dislocations and cracks in metals and semiconductors;
- Classical and machine learning based force fields;
- Uncertainty quantification in atomistic models as well as uncertainty propagation in upper scale models;

Development of a set of tools for analysis of dislocation configurations within the python based open source simulation package libAtoms/matscipy

Belgian Nuclear Research Centre SCK•CEN in collaboration with CIEMAT **Mol/Madrid**
Ph.D. student *2012–2017*
Performing research for the Ph.D. thesis.
Achievements:
- Analysis of *ab initio* data and development of the model of dislocation mediated H retention in tungsten;
- Development of an interatomic potential for W-H-He system and performing a large number of Molecular Dynamics (MD) simulations;
- Implementation of the model in a Rate Theory simulation tool and its validation by comparison with experimental results;

Belgian Nuclear Research Centre SCK•CEN **Mol**
Internship *2012*
Study of radiation hardening of high-Cr steels and model Fe-Cr alloys due to dislocation loops. Results of a large number of MD simulations were analysed in order to provide an input for Dislocation Dynamics (DD) simulation tool.

Scientific and Educational Centre "Hadron" **Saint-Petersburg**
Assistant researcher *2010–2012*
Performing research tasks for the master thesis.

Petersburg Nuclear Physics Institute **Gatchina**
Bachelor thesis internship *2010*
The internship was done in the laboratory of nuclear and elementary particles physics. During the internship VITESS simulation package was modified and used in order to study the possibility of obtaining monochromatic neutron beams from a fission neutron beam.

Invited presentations

Computational Materials Science Seminar **Skoltech Moscow**
Multiscale QM/MM modelling of materials chemomechanics *10th October 2019*

Seminar of Service de Recherche en Métallurgie Physique **CEA Paris-Saclay**
QM/MM study of hydrogen decorated screw dislocations in tungsten *17th June 2019*

Awards

Warwick Faculty of Science, Engineering and Medicine Post-doctoral Research Prize 2020

Service to profession

Reviewer for: Journal of Nuclear Materials, Scripta Materialia, Philosophycal Magazine

Computer skills

Languages: Fortran, C/C++, Python
Operating Systems: Windows, Linux, MacOS
MS Office: Word, PowerPoint, Excel
Simulation packages: LAMMPS, VASP, ASE
SciPy: NumPy, matplotlib, pandas, bokeh
Other: LaTeX, Git, Jupyter notebooks

Languages

Russian: Mother tongue
Italian: A2 CEFR level
English: C1 CEFR level (academic IELTS 7.5)
Dutch: A1 CEFR level

Interests

Sports: Football, Ice hockey, Snowboarding, Swimming, Running
Other: Hiking, Graphic art, Data visualisation