COLD NEUTRON MODERATORS AND RESEARCH OF RADIATION RESISTANCE

Moscow Institute of Physics and Technology (National Research University)

Degree or qualification is awarded: **PhD (Candidate of Science)**

Language of study: **English**
Mode of study: **full-time**
Duration: **4 years**
Availability of free education: **yes**
Price: **375 000 RUB**

Programme webpage at the university website:
https://eng.mipt.ru/programs/cold-neutron-moderators-and-research-of-radiation-resistance/

Programme curator: **Denis Ustyuzhaninov**
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Entry requirements:

- Master's degree / equivalent in a related field
- B2 level of English
- Good track record of publications related to the topic of the intended research
- Strong research proposal 1,500 - 3,500 words

Research supervisor:
Maksim Bulavin
PhD

Supervisor's research interests:
Cold neutron moderators for neutron sources included compact neutron sources, cold moderators design and materials researches, cold neutron spectrum measurements, cryogenics and vacuum techniques. Research of radiation resistance of different materials and equipment from big science and mega science projects (LHC, NICA, ITER, DEMO, ESS etc).

Research highlights:
In this program we use unique equipment for new projects of cold neutron moderators and irradiation facilities and cooperate with leading world science organizations. Financial support is possible.

Supervisor's specific requirements:

- Nuclear physics.
- Neutron activation analysis.
- Spectrometers.

Main publications:

- The world's first pelletized cold neutron moderator at a neutron scattering facility / M. Shabalin [et al.] // Nuclear instruments and methods in physics, section B. – 2014. – Vol. 320. – P. 70-74.
- Pelletized cold moderator of the IBR-2 reactor: current status and future development / M. Bulavin et al // Journal of Physics: Conference Series 746 (2016) 012031.
- Gain factor of the pelletized cold neutron moderator at 22K / M.V. Bulavin [et al.] // Journal of surface investigation: x-ray, synchrotron and neutron techniques, 2020, Vol. 14, №3, pp. 434-436.

- Irradiation facility at the IBR-2 reactor for investigating material radiation hardness / M. Bulavin et al // Physics of Particles and Nuclei Letters 12(2):344-348, March 2015.
- Metal Hall sensors for the new generation fusion reactors of DEMO scale / I. Bolshakova et al // Nuclear Fusion 57(11), June 2017.
- Experimental Evaluation of Stable Long Term Operation of Semiconductor Magnetic Sensors at ITER Relevant Environment / I. Bolshakova // Nuclear Fusion 55(8):083006, August 2015.
- Light yield and radiation hardness studies of scintillator strips with a filler / D. Chokheli et al // Nuclear Instr. And Methods in Physics Res. A, https://doi.org/10.1016/j.nima.2019.03.087, Vol. 930, pp 87-94.

Specializations within this programme