

APPLICATIONS OF THE TAGGED NEUTRONS METHOD

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/applications-of-the-tagged-neutrons-method/>

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:

[Mikhail Sapozhnikov](#)

PhD, DSc

Supervisor's research interests:

Tagged neutrons method is the technique of the distant non-destructive elemental analysis of the substances. Based on the irradiation of the object by fast 14 MeV neutrons and registration of the gamma quanta from reactions of the inelastic scattering. Used for on-line determination of the elemental content of coal, cement, different ores on a conveyor, detection of diamonds inside kimberlite, detectors of explosives etc.

Research highlights:

Research is carried out using unique Russian-made neutron generators. One of them was working 6 years at the Martian rover Curiosity Project. Joint Institute for Nuclear Research in Dubna is a large international scientific center with plenty of possibilities for physicists. Financial support is possible.

Supervisor's specific requirements:

General background in the experimental nuclear physics or basic knowledge of the methods of experimental data treatment in general and processing of the gamma-ray spectra in particular.

Main publications:

- V.Yu. Aleksakhin et al., Detection of diamonds in kimberlite by the tagged neutron method. Nuclear Instruments and Methods, A 785 (2015) 9.
- V.M. Bystritsky et al., DViN – stationary setup for identification of explosives. Physics of Particles and Nuclei Letters, 5 (2008)441.
- V.Yu. Aleksakhin et al., Use of the Tagged Neutron Technique for Detecting Dangerous Underwater Substances, Physics of Particles and Nuclei Letters, 10 (2013) 860.

Specializations within this programme