

Call for applications: PhD studies in collaborative doctoral partnership among Kaunas University of Technology (KTU), Lithuanian Energy Institute (LEI) and the Joint Research Centre of the European Commission (JRC)

Study Program: Technological Sciences, Energetics and Power Engineering (T006)

Research topic: Analysis of spent fuel ageing processes during interim and long storage period

Problem description. This PhD program is aimed to provide relevant separate effect studies of spent fuel ageing process for an interim and long storage period in wet and dry storage facilities using experimental results and include these results in the numerical simulation tools. All activities will consist in two big tasks: (a) experimental work and (b) simulation work.

In the experimental work part, the UO_2 samples will be doped with the strong α -emitter ^{238}Pu and some properties will be monitored periodically by means of XRD, SEM, TEM Vickers Hardness and acoustic microscopy (elastic properties) as a function of the increasing self-irradiation dose.

In the simulation work part, the MFPR-F simulation tool, which is developed in IRSN and deals with the release of a variety of fission products under various conditions, will be modified. The MFPR-F code will be extended to include the capability to simulate the effects of α -self-irradiation in UO_2 at an atomic and mesoscopic scale. To validate the performed modifications, the simulations of above mentioned experiments will be done and comparison with available experimental data obtained at the JRC –Karlsruhe will be performed. Later, the modified MFPR-F code will be applied for the analysis of the self-irradiation effects on the mechanical and thermal properties. Finally, the MFPR-F code will be coupled with the TRANSURANUS code and tested during the simulation of a complete fuel rod.

Expected outcomes.

In the frame of proposed PhD program the following outcomes are expected:

- the detailed thermal and mechanical characteristics of UO_2 doped with the strong α -emitter ^{238}Pu will be provided; (b) the TRANSURANUS code will be extended by coupling with the MFPR-F simulation tool of the IRSN, which deals with the release of a variety of fission products under SNF interim and long storage period.
- at least two common (co-authors from KTU and LEI and JRC) publications in the Clarivate Analytics data base referred by Web of Science Core Collection should be prepared and published; (b) the PhD thesis should be prepared and defended.

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Prerequisites

MSc. in Nuclear Engineering is desirable, the program is targeted for Masters with backgrounds of Mechanical Engineering, Electrical and Computer Engineering, Physics, Chemistry, Material Science. The successful candidate must have strong analytical skills, be proactive and self-driven. The candidate must have interest in researching on the processes in nuclear fuel and professional command of English (both written and spoken).

Collaborative Doctoral Partnership between KTU, LEI and the JRC

PhD studies will be developed within the framework of the collaborative doctoral partnership between the Joint Research Center of the European Commission (JRC) and the Kaunas University of Technology (KTU), Lithuanian Energy Institute (LEI).

It is expected that the student will start and finish PhD studies at the Lithuanian Energy Institute and will spend a considerable part of the study (at least 12 months) at the JRC premises in Karlsruhe (Germany).

During this period the student will be paid according to the corresponding **Grant Holder (GH) scheme**^{[1][2]}. Temporary employment contract covering the doctoral period of the candidate during the stay at JRC. This doctoral position covers a competitive salary for the research work carried out during this period.

The JRC will also nominate a topic advisor and will provide relevant data and access to the necessary research infrastructure – thus, the PhD student will be jointly supervised by LEI and JRC.

After successfully completing the PhD program conditions, the candidate will be awarded the doctoral degree by KTU.

[1] https://ec.europa.eu/jrc/sites/jrcsh/files/jrc_grantholder_rules.pdf

[2] https://ec.europa.eu/jrc/sites/jrcsh/files/jrc_ispra_vademecum-post-2014_en.pdf

Students selection procedure

The selection is made in two phases.

1) Selection procedure at the KTU - LEI:

- The KTU - LEI performs preselection procedure according the Regulation of Research Doctoral Studies of the institutions of joint doctoral studies (approved by Senate of KTU) and Regulations for the admission to doctoral studies of KTU (with participation of JRC representatives as observers in the interview of applicants).
- The KTU - LEI establishes a short-list of two to five candidates per PhD position.
- The KTU - LEI informs the short-listed candidates about the results of the selection and that it will send their application (CV, motivation letter and any other relevant documents) to the JRC.

2) Selection procedure at the JRC:

- The decision on the recruitment of the candidate is taken by the JRC, following the below selection process and in accordance with the **GH Rules**^[1].
- KTU - LEI sign PhD study contract with the selected candidate after information of the outcome of the selection process is received from the JRC.

Application for the KTU - LEI preselection procedure

Applicants for doctoral studies must submit the following documents:

- Application Form, indicating the field of science, research topic and form of funding;
- List (full bibliographic description) and Copies of scientific publications; in the absence of such works – a Research Paper, the topic of which is in accordance with the topic of the dissertation specified in the application;
- Official legalised Bachelor's and Master's diplomas or a higher education degree equivalents and academic transcripts. If said documents are issued in foreign institutions, they must be recognized in the Republic of Lithuania in accordance with the appropriate procedure (recognition of educational documents is carried out by the Centre for Quality Assessment in Higher Education <https://www.skvc.lt/>);
- Curriculum Vitae;
- References by two academic referees or researchers from the relevant field of science;
- Copy of ID card or passport;
- Certificate of English proficiency: IELTS ≥ 6.5 , TOEFL ≥ 90 , ECFR $\geq C1$, or equivalent
- Other relevant documents (copies of certificates of a course completion, certificate of passing doctoral level exam, etc.).

Eligibility criteria - JRC

In accordance with Article 2a) of the Grantholder Rules (GH), candidates should, at the start of the employment contract with the JRC:

- have the nationality of a Member State of the EU or a country associated to the Research Framework Programmes. Candidates from other countries may also apply. However, only the Director-General of the JRC may allow their recruitment, following the security clearance and derogation procedure for non-EU country nationals in force at the JRC. COLLABORATIVE DOCTORAL PARTNERSHIP AGREEMENT No. 35745 (pages 19 and 20)
- be enrolled in a PhD programme with KTU - LEI as described above.

How to apply

Fill in the *application form*, add all the required documents, and mail it to the LEI (see address below). The failure to provide on time all required documents will result in the exclusion from the competition.

Address to deliver documents to:

Lithuanian Energy Institute
Breslaujos g. 3, room AK-233.
LT-44403 Kaunas, Lithuania.

Contact person:

Jolanta Kazakevičienė
Studies Administrator
email: studijos@lei.lt

Dates and deadlines:

Submission of applications for KTU-LEI preselection procedure:	30 October, 2020
Motivational interviews in KTU-LEI with participation of JRC representatives as observers:	6 November, 2020
Notification of applicants about the results of selection into KTU-LEI short-list candidates:	9 November 2020
Notification of applicants about the JRC competition results:	27 November, 2020
KTU-LEI Study Agreement:	11 December, 2020