



DOCTORAL RESEARCH TOPIC:

Numerical study of the processes taking place in nuclear facilities

RESEARCH FIELD:

Energetics and Power Engineering (T 006)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

Nuclear energy can significantly contribute to the solution of the current energy problems in the EU and Lithuania, as it would positively contribute to security of supply, stability of energy prices and the achievement of carbon dioxide reduction goals. Therefore, research related to the safety of existing and new nuclear power plants remains relevant. At the same time, it should be kept in mind that the number of nuclear facilities that have reached the end of their service life time, as well as the amount of spent nuclear fuel, is increasing. Therefore, the work related to the disposal of spent fuel and radioactive waste and the dismantling of nuclear facilities will only increase in the future, and at the same time, related scientific research will be very necessary.

This topic is intended to solve problems related to the safety of generation III and III+ nuclear reactors, the design and safety assessment of Small Modular Reactors and Advance Modular Reactors. These problems are related to the application of new Accident Tolerant Fuel, passive safety systems, etc. Also, the problems of long-term storage of spent nuclear fuel and disposal of radioactive materials. This topic covers many scientific problems related to the modelling of coolant flows and heat exchange in nuclear fuel assemblies, reactor cooling systems and reactor containment. A separate PhD thesis can be appointed for the modelling features of natural circulation systems applied in Small Modular Reactors or numerical evaluation of aging processes of nuclear reactor component materials. The topic may also include the new installations' (related to fission) probabilistic assessment and extreme events risk research based on data science.

During the PhD work the processes in nuclear facilities will be analysed, selected experiments will be modelled, computer software capabilities will be evaluated and recommendations will be prepared for simulation of real processes in nuclear facilities. Deterministic and probabilistic analysis methods (performing reliability estimation of systems) will be applied. Research conducted in this topic will contribute not only to increasing the safety of currently operating nuclear power plants, radioactive waste management, but also to the development and licensing of Small Modular Reactors that are being developed.

In this topic, several PhD dissertation theses are possible, which will be coordinated with future doctoral students and can be supervised by members of the scientific research group.

SCIENTIFIC SUPERVISOR:

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