



**Seminarium Zakładu Energetyki Jądrowej i Analiz Środowiska (UZ3)**  
**Departament Badań Układów Złożonych (DUZ)**

Wtorek: **28.01.2025 godz. 11:30**

**Seminarium hybrydowe:** sala 172, bud. 39 (Cyfronet, III piętro)

transmisja online: <https://www.gotomeet.me/NCBJmeetings/uz3-and-phd4gen-seminars>

**Speaker: in person**

**Hisham Elgendy**

NCBJ

**Advancements in Thermal-Hydraulic Modelling for DFRs: Variable Turbulent Prandtl Number Approach**

**Abstract:**

The presentation focuses on the enhancements made in thermal-hydraulic modeling for Dual Fluid Reactor (DFR) demonstrators, with an emphasis on the impact of using a variable turbulent Prandtl number. The research presented integrates Kays correlation to address the limitations of traditional approaches, which use a constant Prandtl number and often lead to inaccuracies in heat transfer predictions for low-Prandtl-number liquids. The study demonstrates how the variable turbulent Prandtl number significantly improves the accuracy of simulations, offering more precise predictions for heat transfer, temperature distribution, and flow dynamics within the DFR. Simulations were conducted using Reynolds numbers ranging from 15,000 to 250,000, representing various operating conditions in the reactor. The results reveal critical insights into uneven flow distributions and temperature variations, highlighting areas of high turbulence and potential hotspots that could impact reactor safety and efficiency. The findings also underscore the importance of model selection in computational fluid dynamics (CFD) analysis for advanced reactor designs. This presentation will explore the methodology, key findings, and potential applications of these modeling improvements for next-generation nuclear reactors.

Serdecznie zapraszamy  
Tomasz Kwiatkowski, Mariusz Dąbrowski

**Bio:**

**Dr inż. Hisham Elgendy** - is a researcher with a background in Mechanical Power Engineering, holding a Bachelor's degree in Mechanical Power, a Master's degree in Nuclear Engineering, and a PhD in Physics, with a specialization in Computational Fluid Dynamics (CFD) analysis.

His research focuses on advanced thermal-hydraulic modeling for next-generation nuclear reactors, specifically the Dual Fluid Reactor (DFR). Dr. Elgandy's work involves the analysis of low Prandtl number fluids and their behavior in complex reactor environments, contributing to improving reactor safety, efficiency, and overall design. He is committed to enhancing the accuracy of CFD simulations and addressing critical challenges in the field of nuclear energy, with a particular emphasis on reactor heat transfer optimization and turbulence modeling.