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

Wtorek: **08.11.2022**

Wyjątkowo 14:00

dr inż. Stefan Doerffer

KSD Professionals Inc.

Overview of Critical Heat Flux – Mysterious World of CHF

Abstract:

This seminar provides an overview of the most essential aspects of the critical heat flux (CHF) research applicable to fuel channels (CANDU reactors) and fuel assemblies (LWRs). It is based on 10-year experience of the author who worked for Atomic Energy of Canada Ltd. (AECL) at the Chalk River Nuclear Laboratories. It starts with an introduction to pool boiling and its crisis followed by two-phase flow structures and two extreme types of CHF mechanisms. The seminar presents the CHF experimental effort carried out world-wide using relatively the simplest flow geometry (tubular) and the cheapest setups. Then, in a more complex flow geometry (annular) ending in the most complex one (fuel bundles and assemblies) and the most expensive setups. Then it focuses on CHF prediction methods used in the safety computer thermohydraulic codes for design and licensing purposes. To complement the seminar the CHF enhancement methods and the CHF fluid-to-fluid modelling are discussed as well. Still this CHF world remains mysterious and requires further research effort.

Serdecznie zapraszamy
Mariusz Dąbrowski, Tomasz Kwiatkowski

<http://www.phd4gen.pl>

Bio: Dr. Stefan S. DOERFFER, P.Eng.

Stefan Doerffer is a graduate of the Shipbuilding Dept. of the Gdańsk Institute of Technology, Poland, with subsequent 18-year career in the Polish shipbuilding industry – creation of computer codes for ship systems' design. Ph.D. degree from the Polish Academy of Sciences Institute in Gdańsk. As a scientist of this institute, then of the University of Strathclyde in Glasgow, Scotland, the University of Manchester in Manchester, England, and the University of Ottawa in Ottawa, Canada, worked on safety of nuclear reactors.

The following decade as a researcher at the Calk River Nuclear Laboratories of AECL, focused on safety of CANDU reactors from thermal-hydraulics viewpoint. The next decade held various positions at AECL, Sheridan Park. Among them as a team leader of reactor safety code developers, a Safety Design manager, and a licensing manager of power reactors. For four years he coordinated three AECL's contracts with the USA Idaho and Brookhaven National Laboratories, and INVAP (Argentinean establishment) related to the MAPLE reactor for medical radioisotopes production. Interacted with nuclear regulators (CNSC and USNRC) and collaborated with Canadian and US utilities.

His list of professional publications exceeds 100 positions. Served as external reviewer and examiner for Ph.D. theses at Canadian universities. For the last 30 years he has been very active in his native Poland giving numerous seminars and lectures on nuclear reactor technologies. Also supported the Polish Nuclear Power Program. Holds Professional Engineer Licenses in Canada and Poland. In 2021-2022 supported the SMR project - the IMSR400 – designed by Terrestrial Energy Inc.

Currently, as co-owner and director runs a consulting company KSD Professionals Inc.