

Seminarium Zakładu Energetyki Jądrowej i Analiz Środowiska (UZ3)

Departament Badań Układów Złożonych (DUZ)

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**Application of magnetohydrodynamics pumps in the fuel loop
of Dual Fluid Reactor**

Abstract:

Magnetohydrodynamics (MHD) pumps are devices that cause the movement of a (conductive) liquid by the generated electromagnetic field. The major advantage of these pumps is that they do not have any moving parts inside that could be damaged by the temperature of the medium. Since the 1950s, scientists have been interested in the use of magnetohydrodynamic pumps in nuclear power engineering, mostly in the loop of liquid sodium or molten salts coolant. Nobody, however, has dealt with the use of MHD pumps for the fluid of parameters that are expected in a dual-fluid reactor (DFR).

In DFR, a chromium-uranium alloy with a lower melting point than for other mixtures of these elements is to be used as a fuel. Currently, a minidemonstrator of DFR is being developed that will use a pure uranium-238. The operating temperature will be as high as 1100-1300 °C, which poses a challenge for the electromagnetic pumps.

The aim of the seminar is to discuss different types of MHD pumps, presenting the advantages and disadvantages of several designs in the context of their possible application in DFR.

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