

Seminarium Studium Doktoranckiego NCBJ
Poniedziałek, 16 kwietnia, godzina 9:00
Sala 22 w NCBJ, Hoża 69

Speaker: Jakub Sierchuła
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Title: Dual Fluid Reactor – neuronics and fuel cycle modeling

Abstract: Dual Fluid Reactor (DFR) is a novel concept of a fast heterogeneous nuclear reactor which falls-off the classification of Generation IV International Forum (GIF). Its key feature is the employment of two separate liquid cycles, one for fuel and one for the coolant. In the DFR both cycles can be separately optimized for their respective purpose, leading to advantageous consequences: a very high power density resulting in cost savings, and a highly negative temperature feedback coefficient, enabling self-regulation without any control rods or mechanical parts in the core. During a seminar, reactor core model with new eutectic U-Cr fuel composition and liquid lead as a coolant will be presented. The neutron flux density as a function of the energy in core was calculated, as well as fuel burnup and effective multiplication factor/reactivity changes during reactor exploitation. In the reference design, fuel circulates at an operating temperature of 1300 K and can be processed on-line in a small internal processing unit utilizing fractionated distillation or electro refining. Except for heat or electricity generation, the unit with Dual Fluid Reactor could provide away some medical radioisotopes like Mo-99/Tc-99m.