

Seminarium Studium Doktoranckiego NCBJ
Poniedziałek, 1 kwietnia, godzina 9:00
Sala 404 w NCBJ, Pasteura 7

Speaker: **Jakub Sierchula (Studium Doktoranckie NCBJ)**

Title: Determination of the liquid eutectic metal fuel Dual Fluid Reactor (DFRm) design – steady state calculations

Abstract: The Dual Fluid Reactor (DFR) is a novel concept of a very high-temperature (fast) reactor which falls-off the classification of Generation IV International Forum (GIF). DFR makes best of the two previous designs: Molten Salt Reactor (MSR) and Lead-cooled Fast Reactor (LFR). During the presentation a novel reactor design (DFRm) with the liquid eutectic U-Cr metal fuel composition and the lead coolant will be present. By performing the first steady state neutronic calculations for such a reactor it will be shown that this 250 MWth reactor is critical, and that it can operate almost 20 years without refuelling. The geometry (reflector thickness, fuel tubes pin pitch) was optimise with respect to the multiplication factor. The optimisation together with some other opportunities for the liquid metal fuel design (e.g the use of electromagnetic pumps to circulate the medium) allows DFRm to be of a small size. This rises economy of the construction as expressed nicely in terms of the Energy Return on Invested (EROI) factor which is even higher than for the molten salt fuel design (DFRs). Last but not least, DFRm has all the (fuel, coolant, reflector) temperature coefficients negative, which is an important factor of the passive safety.