



UNIWERSYTET SZCZECIŃSKI  
INSTYTUT FIZYKI

## Środowe seminarium w Instytucie Fizyki

December 22<sup>nd</sup> – 12:00

**Dr. Rakesh Dubey**

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### *“Revisiting the fusion-fission mechanism in actinide region”*

Nuclear fission (i.e fission of actinide nuclei) was discovered in December 1938 by chemists Otto Hahn and Fritz Strassmann and physicists Lise Meitner and Otto Robert Frisch. Today, it has reached the venerable age of 83 years from its first fission discovery, and it still lacks an understanding in terms of a fully quantum microscopic approach along with experimental observations. Here we attempted the measurements on mass, angular distributions, fusion and fission cross section of fission fragments from light (Pa) to heavy actinide nuclei, produced in fusion reactions spherical (lead isotopes, Bi) and deformed targets (actinide target U, Th, Np) with projectiles of mass  $A_p < 22$  (Li-7, B, ..., F-19,) will be discussed. The measured mass distribution data agree well with statistical model GEMINI++ predictions and the measured angular anisotropy data exhibit deviation from the Transient Statistical Model (TSM) results at energies below the fusion barrier. The fission cross section data are reproduced fairly well using the coupled-channel CCFULL calculations. These findings are incorporated in a systematic approach to understand the influence of entrance channel variables on fission dynamics of heavy actinide nuclei produced in reactions involving lighter projectiles ( $A_p < 22$ ) on actinide targets. The systematic study indicates signatures of complete fusion-fission with full equilibration in mass degree of freedom while showing incomplete relaxation of shape degree of freedom in reactions with projectiles of mass  $A_p < 22$ .