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Nairi Baghdasaryan
NCBJ

Quantification of geometrical and material data uncertainties in TRISO fuel performance analysis

Abstract:

TRISO fuel particles are considered as one of the potential nuclear fuel forms for the next-generation nuclear reactors (HTGR). Though the TRISO fuel manufacturing process has been developing over recent years, there are still statistical variations and uncertainties in geometrical configurations and material properties from particle to particle. Taking into account, that the physical processes ongoing in TRISO fuel particles during the operation are very correlated, small uncertainness in one model can lead to a significant uncertainty of another model's results. Therefore, appropriate uncertainty quantification in TRISO fuel particles is essential. On the other hand, one may ask how optimized is the current version of TRISO particles and if is there any room for further optimization.

During the seminar, I will present the quantification of the uncertainties coming from geometrical and material data in TRISO fuel performance models. For the analysis the Bison code was used and the AGR-2 experiment was selected as a reference case. In total 10^5 calculations were performed for the uncertainty and optimization analysis: changing geometrical and material data within their uncertainty range.

Serdecznie zapraszamy
Mariusz Dąbrowski, Tomasz Kwiatkowski
http://www.phd4gen.pl

Bio:
Nairi Baghdasaryan is a PhD candidate at the National Centre for Nuclear Research. His research is focused on the Modeling and Uncertainty Quantification of Nuclear Fuel Performance in High-Temperature Gas-Cooled Reactors (HTGRs).