

Challenges and Achievements in IFMIF-DONES Neutronics Activities

Y. Qiu^{1*}, I. Álvarez³, K. Ambrožič⁴, T. Berry², B. Bieńkowska⁵, H. Chohan², A. Čufar⁴, D. Dworak⁶, A.J. Lopez-Revelles⁷, V. Lopez⁷, F. Mota⁸, M.J. Martinez-Echevarria³, T. Piotrowski⁹, A. Serikov¹, G. Stankunas¹⁰, A. Tidikas¹⁰, L. Taling², G. Tracz⁶, U. Wiącek⁶, M. Ansorge¹¹, D. Jimenez-Rey⁸, E. Mendoza⁸, J. Malec⁴, J. Martínez-Serrano¹², S. Akbaş⁵

¹KIT, Germany, ²UKAEA, UK, ³UGR Spain, ⁴JSI, Slovenia, ⁵IPPLM, Poland, ⁶IFJ-PAN, Poland, ⁷UNED, Spain, ⁸ CIEMAT, Spain, ⁹WUT, Poland, ¹⁰LEI, Lithuania, ¹¹NPI-CAS, Czech Republic, ¹²UMA, Spain. *corresponding author: yuefeng.qiu@kit.edu

Introduction

- IFMIF-DONES is an accelerator-based neutron irradiation facility that provides the necessary irradiation data for the qualification of materials for the DEMO fusion power plant.
- It utilizes a 125 mA and 40 MeV deuteron beam to produce intense neutrons in the flux of 10^{14} - 10^{15} n/cm²/s. This facility will serve as a critical tool for irradiating and testing material samples, as well as addressing radiation safety concerns.
- The challenges include the geometry complexity, multiple particle coupled simulations, complex radiation source terms, heavy shielding simulations, and more.

