

Computational neutronics analyses of deuteron interactions with lithium target in IFMIF-DONES for fusion applications

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Computational simulations of the interaction of an accelerated deuteron ion (D^+) beam with a lithium target are essential for the IFMIF-DONES project under construction in Spain. This work continues the scope of radiation transport parallel computations on the Marconi-Fusion HPC [1], now at the 8th cycle of the MCHIFI (Monte Carlo High Fidelity) HPC EUROfusion project. Neutron spectra and atomic and nuclear responses have been calculated using the Monte Carlo method with the MCNP and PHITS particle and ion transport codes. Energy deposition of the D^+ ions on the atomic and nuclear reactions in lithium of IFMIF-DONES is illustrated in Figure 1. The ions are accelerated up to 40 MeV energy and 125 mA current [2].

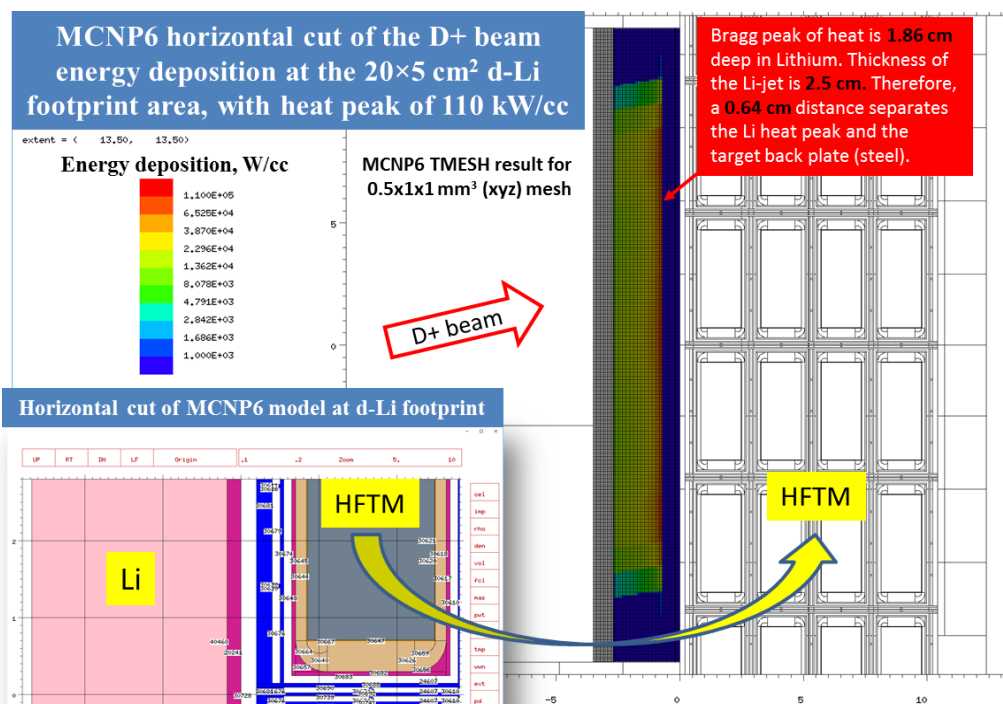


Figure 1: D^+ ion beam energy deposition in Li target with $Li(d, xn)$ neutron source in IFMIF-DONES.

References

- [1] A. Serikov, et al., "Monte Carlo radiation transport parallel computations on Marconi-Fusion HPC for the IFMIF-DONES radiation shielding tasks," 4th Fusion HPC Workshop, online, November 29-30, 2023, <https://hpcfusion.bsc.es/>
- [2] Y. Qiu, et al., "Overview of recent advancements in IFMIF-DONES neutronics activities," Fusion Engineering and Design **201** (2024) 114242, <https://doi.org/10.1016/j.fusengdes.2024.114242>.