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Assessment of the beam–target interaction of IFMIF: A state of the art

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The main requirement for an efficient and safe operation of the IFMIF plant is the stability of the Li jet. The stability is related to the thermohydraulic behaviour and can be affected by the beam–target interaction. The waviness of the jet must stay within rather narrow limits to protect the backwall from beam impact and to maintain stable irradiation conditions in the test modules. Thermal and momentum transfer of the beam may destabilize the flow structure, cause shock waves and increased evaporation or aerosol formation. Different aspects of beam interaction have been analyzed in the past, but a comprehensive assessment is still lacking. This contribution provides an overview of the IFMIF related beam–free lithium surface interaction studies including a description of the underlying basics. As it comes out from numerical analyses that the impact of thermal expansion and of the momentum transfer caused by the beam are still small enough to be ineffective for constructive interferences, beam–target interaction is not to be expected to have a critical impact on jet stability.

Summary

This contribution provides an overview of the IFMIF related beam–free lithium surface interaction studies.

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