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The IFMIF-DONES facility: a fusion-oriented 5 MW superconducting CW linear accelerator

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IFMIF-DONES (International Fusion Materials Irradiation Facility, DEMO-Oriented Neutron Early Source) –a powerful neutron irradiation facility for irradiation of materials to be used in fusion reactors –is planned as part of the European roadmap to fusion electricity. Its main goal will be to characterize and qualify materials under a neutron field similar to the one faced in a fusion reactor, developing a material database for the future fusion nuclear reactors.
The facility is based on an intense neutron source produced by a high current deuteron beam impinging on a liquid lithium curtain, aiming to generate by stripping reactions neutrons with an energy spectrum and flux similar to those expected to be seen by the first wall of a fusion reactor.

The IFMIF-DONES facility has accomplished the preliminary design phase and currently in its detailed design phase. The next phase will be the preparation for the construction of the facility. This contribution presents the status of IFMIF-DONES design developed in the framework of the EUROfusion work programme, integrating the lesson learnt from the IFMIF/EVEDA Project (International Fusion Materials Irradiation Facility/ Engineering Validation and Engineering Design Activities - Broader Approach (BA) Agreement signed between EURATOM and Japanese Government), through a common program which includes the different commonalties and interfaces of the two projects.

An overview of the present design status of the facility will be provided putting emphasis on the design status of the high current superconducting LINAC, responsible for delivering the 5 MW D+ beam at 40 MeV with very high inherent availability, focusing on the main challenges and the related R&D programme. The prospects for the construction and the commissioning of the facility in Granada (Spain) will be also reviewed.

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Footnotes

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