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The Accomplishment of the Engineering Design Activities of IFMIF/EVEDA: the European-Japanese Project Towards a Li(d,xn) Fusion Relevant Neutron Source

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The International Fusion Materials Irradiation Facility (IFMIF), presently in its Engineering Validation and Engineering Design Activities (EVEDA) phase under the frame of the Broader Approach Agreement between Europe and Japan, has accomplished on summer 2013, on schedule, its EDA phase with the release of the engineering design report of IFMIF plant, which is here described, compliant with our mandate. Many improvements of the design from former phases are implemented, relevantly a reduction of beam losses and operational costs thanks to the superconducting accelerator concept; the re-location of the quench tank outside the Test Cell with a reduction of tritium inventory and a simplification on its replacement in case of failure; the separation of the irradiation modules from the shielding block gaining irradiation flexibility and enhancement of the remote handling equipment reliability and cost reduction; and the water cooling of the liner and biological shielding of the Test Cell, enhancing the efficiency and economy of the related sub-systems. In addition, maintenance strategy has been modified to allow a shorter yearly stop of the irradiation operations and a more careful management of the irradiated samples. The design of IFMIF plant is intimately linked with the EV activities carried out since the entry into force of IFMIF/EVEDA in June 2007. These last and their on-going accomplishment have been thoroughly described elsewhere [1], which combined with the present paper allows a clear understanding of the maturity of the European-Japanese international efforts. This released intermediate design report, which could be annexed if required concurrently with the accomplishment of the on-going EV activities, will allow taking decisions on its construction and/or serve the basis for a less ambitious facility in terms of dpa, aligned with the needs of our fusion community.

[1] J. Knaster et al., 2013 Nuclear Fusion 53 116001

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Primary author: Dr KNASTER, juan (IFMIF/EVEDA)

Presenter: Dr KNASTER, juan (IFMIF/EVEDA)

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