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Proposal for an high Z liquid metal divertor

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Power exhaust is a key mission in the roadmap to the future fusion reactor. Several alternatives have been proposed, among which the use of liquid metals (LM) as plasma facing materials. The presentation will thus focus on the latter, as it will give an overview on the proposal for an high Z liquid metal divertor. A review of the main experiments performed in the last few decades on the Frascati Tokamak Upgrade (FTU), as well on other fusion relevant devices in the word will be given.
The analysis of the results of the above mentioned experiments, have lead to the design of a tin based liquid metal target compatible with the actually foreseen DEMO plasma scenario.
Several aspects of the use of LM in a tokamak –such as evaporation, sputtering, retention, etc. –will be addressed since they have been a key parameters in the design of a LM in vessel components. In this reference, corrosion and compatibility issues will be addressed too.
To conclude, the design compatibility of the test Liquid Metal Divertor (LMD) module with the Divertor Tokamak Test facility (DTT) [1] will be shown. The possibility to test a liquid target in one of the four divertor test module in the DTT facility has been evaluated and will be presented in the framework of the DTT Research Plan.

[1] G. M. Polli, "Divertor Tokamak Testing Facility (DTT): A Test Facility for the Fusion Power Plant", (2021) Offshore Mediterranean Conference and Exhibition, 978-88946678-0-6

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