

Engineering integration constraints for advanced magnetic divertor configurations in DEMO

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The divertor configuration defines the power exhaust capabilities of DEMO as one of the major key design parameters and sets a number of requirements on the tokamak layout, including port sizes, PF coil positions, and size of TF coils. It also requires a corresponding configuration of plasma-facing components and a remote handling scheme to be able to handle the cassettes and associated in-vessel components the configuration requires.

Alternative magnetic configurations to that baseline ITER-like single-null (SN) –double-null, snowflake, X-, and super-X –exist and potentially offer power-handling solutions to the limits imposed by plasma-facing component technology and first-wall protection whilst maintaining good core plasma performance. But these options impose significant changes on machine architecture, increase the machine complexity and affect remote handling and plasma physics and so an integrated approach must be taken to assessing the feasibility of these options.

In this contribution we describe the engineering and physics limitations which must be respected in assessing the impact of incorporating these alternative configurations into DEMO, including requirements on remote handling access, forces on coils, plasma control and performance, etc.

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