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Divertor design for HL-2A tokamak modification

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ABSTRACT

This article introduces the new divertor design for the planned upgrade to HL-2A and details the optimization of the divertor parameters, including the target geometry, throat width, and the size and location of the pumping chamber entrance. The basic requirements are to provide tolerable power loads on the target plates and sufficient particle exhaust for the $I_p = 1.2\text{MA}$, 10–20 MW auxiliary heated reference discharge. The SOLPS5.0 code package is used to generate a database. A vertical target divertor configuration has been adopted as the first conceptual design, which gives a peak heat load on the divertor target of 4–10 MW/m² for an anticipated power flux into the SOL of 5–10 MW discharge. The pumping efficiency is found to increase by a factor of 3–4 when the divertor gap is narrowed from 5.5 to 2.0 cm.

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