

Abstract Submitted
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X-Divertors on ITER - with no hardware changes¹ PRASHANT VALANJU, BRENT COVELE, MIKE KOTSCHENREUTHER, SWADESH MAHAJAN, Institute for Fusion Studies, UT Austin, CHARLES KESSEL, Princeton Plasma Physics Lab — Using CORSICA, we have discovered that X-Divertor (XD) equilibria are possible on ITER – without any extra PF coils inside the TF coils, and with no changes to ITER’s poloidal field (PF) coil set, divertor cassette, strike points, or first wall. Starting from the Standard Divertor (SD), a sequence of XD configurations (with increasing flux expansions at the divertor plate) can be made by reprogramming ITER PF coil currents while keeping them all under their design limits (Lackner and Zohm have shown this to be impossible for Snowflakes). The strike point is held fixed, so no changes in the divertor or pumping hardware will be needed. The main plasma shape is kept very close to the SD case, so no hardware changes to the main chamber will be needed. Time-dependent ITER-XD operational scenarios are being checked using TSC. This opens the possibility that many XDs could be tested and used to assist in high-power operation on ITER. Because of the toroidally segmented ITER divertor plates, strongly detached operation may be critical for making use of the largest XD flux expansion possible. The flux flaring in XDs is expected to increase the stability of detachment, so that H-mode confinement is not affected. Detachment stability is being examined with SOLPS.

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