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P5.1048 Field line escape pattern in a poloidally diverted tokamaks

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To simulate magnetic configuration in tokamaks like ITER, we use a wires model consisting of electric currents in five parallel infinite wires to obtain double-null magnetic surfaces with specific choices of magnetic axis position, triangularity and elongation. This model reproduces quite well the ITER configuration and it can delineate dynamical properties of open and closed field lines near the separatrix. Comparing to numerical equilibria reconstructions to simulate plasma in the presence of poloidal divertors, which are time-consuming, this model is faster and versatile, reproducing ITER like magnetic topology. Due to the flexibility of the wires model we can consider different effects of perturbing magnetic field lines near the separatrix. One of them is to include a perturbing error field, due to asymmetries on the external coils[1,2]. Moreover, we include magnetic perturbations caused by external coils, similar to correction coils installed at the tokamak DIII-D and those that will be installed at ITER[3,4,5]. We integrate numerically the field line differential equations to obtain the deposition patterns of magnetic field line in the divertor plate. We show that the results agree with those observed in sophisticated simulation codes.

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