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**Calculation of fractal dimension of magnetic footprint in double-null divertor tokamaks** WILLIE CRANK, ALKESH PUNJABI, HALIMA ALI, Hampton University — The simplest symplectic map that represents the magnetic topology of double-null divertor tokamaks is the double-null map, given by the map equations: $x_1$=$x_0$-k$y_0$(1-$y_0^2$), $y_1$=$y_0$+k$x_1$. k is the map parameter. The map parameter k represents the generic topological effects of toroidal asymmetries. The O-point is at (0,0). The X-points are at (0,±1). We set k=0.51763, and $N_p$=12. $N_p$ is the number of iterations of map that are equivalent to a single toroidal circuit of the tokamak. The width of stochastic layer near the upper and the lower X-points is exactly the same and equals 1.69 mm. We start 100,000 filed lines in the stochastic layer near the X-points and advance them for at most 10,000 toroidal circuits. We use the continuous analog of the map to calculate the magnetic footprints in the double-null divertor tokamaks. We calculate the area of the footprints and their fractal dimension. The area is A=0.0024 $m^2$, and fractal dimension is $d_{frac}$=1.0266. This work is supported by US Department of Energy grants DE-FG02-07ER54937, DE-FG02-01ER54624 and DE-FG02-04ER54793.

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