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Homoclinic tangle of the separatrix of the Symmetric Quartic Map TALISE SETTLE, BILAL JONES, DANIELLE BALDWIN, HALIMA ALI, ALKESH PUNJABI, Hampton University — The equilibrium separatrix of the Symmetric Quartic Map (SQM) [M. Jones et al, Phys. Plasmas 16, 042511 (2009)] is calculated in natural canonical coordinates (NCC) [A. Punjabi, Nucl. Fus. 49, 115020 (2009)] and the SQM is constructed in NCC. The map parameter of the SQM is used to represent the magnetic perturbation as in the Standard Map [B. V. Chirikov, Phys. Rep. 52, 263 (1979)]. The homoclinic tangle of the ideal separatrix of the SQM is calculated for different values of the map parameter. The parameters in the generating function of the SQM are so chosen that the height, the width, the elongation and the poloidal flux inside the separatrix is same as in the simple map [A. Punjabi, A. Verma, and A. Boozer, Phys. Rev. Lett. 69, 3322 (1992)]. The purpose of this research is to compare the homoclinic tangle of the SQM with that of the simple map. The separatrix of the simple map is open and unbounded; while the separatrix of the SQM is closed and compact. Motivation is to see what role the topology of the separatrix plays in its homoclinic tangle in single-null divertor tokamaks. This work is supported by grants DE-FG02-01ER54624, DE-FG02-04ER54793, and DE-FG02-07ER54937.

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