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Stochasticity and orbit types in advanced beam-driven FRCs FRANCESCO CECCHERINI, LAURA GALEOTTI, DAN BARNES, SEAN DETTRICK , HENK MONKHORST, Tri Alpha Energy Inc., TAE TEAM — Advanced beam-driven FRCs (Field Reversed Configurations) represent a plasma configuration which is aimed to reach steady state through external sustainment. In an advanced beam-driven FRC the plasma has a very rich selection of orbit types, namely, drift, betatron, figure-8 and type-I. How much each type contributes to the total quantity of orbits strongly depends on both plasma and external field parameters and it may include regular and stochastic orbits with very different ratios. We study the orbit type distribution as well as the fractions of regular and stochastic orbits for a set of realistic advanced beam-driven FRC equilibria in very different plasma regimes. In particular, we investigate the dependences of the orbit type distribution on the equilibrium parameters and we discuss the relevant role of the FRC parameter s in providing a good estimate of the total quantity of stochastic orbits. A first investigation of the possible role of stochastic orbits in thermalizing processes induced by magnetic pumping techniques is presented.

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