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Ideal Magnetohydrodynamic Simulations of Low Beta Compact Toroid Injection into a Hot Strongly Magnetized Plasma[1] WEI LIU, SCOTT HSU, HUI LI, LANL — We present results from three-dimensional ideal magnetohydrodynamic simulations of low beta compact toroid (CT) injection into a hot strongly magnetized plasma, with the aim of providing insight into CT fueling of a tokamak with parameters relevant for ITER (International Thermonuclear Experimental Reactor). A regime is identified in terms of CT injection speed and CT-to-background magnetic field ratio that appears promising for precise core fueling. Shock-dominated regimes, which are probably unfavorable for tokamak fueling, are also identified. The CT penetration depth is proportional to the CT injection speed and density. The entire CT evolution can be divided into three stages: (1) initial penetration, (2) compression in the direction of propagation, and reconnection with the background magnetic field, and (3) coming to rest and spreading in the direction perpendicular to injection. Tilting of the CT is not observed due to the fast transit time of the CT across the background plasma.

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