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Stability of high beta poloidal configurations in tokamak geometries. P.-A. GOURDAIN, S.C. COWLEY, J.-N. LEBOEUF, R.Y. NECHES, UCLA Physics Department — The resilience of high beta plasmas to internal instabilities precluding high kinetic pressure in conventional tokamaks remains to be fully examined. In fact, a bell shape current profile restricts the stability of these plasmas below the Troyon limit. Furthermore, such configurations exhibit little magnetic shear as the safety factor q varies from 1 at the center of the plasma to only 3 at the edge. We propose to explore the stability of highly shifted plasma equilibria using the high beta ideal MHD code CUBE and the stability code DCON. Using the geometry and magnetic field of the Electric Tokamak, we will demonstrate that fixed-boundary plasmas with Shafranov shifts on the order of unity are stable for several MHD criteria such as Mercier, resistive or high-n ballooning. The strong magnetic shear of these configurations makes them quite attractive for turbulence suppression and ballooning stability. Stable plasmas with a peak beta of 15% and a shift of 75% have been reached. A stable path from regular to highly shifted current profile configurations will also be discussed.

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