

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Decoupling shape and position control on TCV FEDERICO PESAMOSCA, FEDERICO FELICI, STEFANO CODA, EPFL-SPC, 1015 Lausanne, Switzerland — Shaping of the plasma cross section leads to improved performance in tokamaks. TCV features a digital shape and position controller, which at present relies completely on real time magnetic equilibrium reconstruction. Its computational time, comparable to the vertical instability growth rate of elongated plasmas, limits the margin for stable operations. In recent experiments, the flexibility of TCV was exploited using its independently powered poloidal field coils to improve position and shape control. The full set of 16 coils is numerically optimized to stabilize the plasma while minimizing the input request from power supplies. A new position error signal to be minimized allows decoupling as it combines slow and reliable information on the plasma location (from magnetic equilibrium reconstruction) with analog position observers based on magnetic diagnostics, which are less precise but highly responsive to fast unstable plasma displacements. Orthogonal coil combinations can then be used to control independently the plasma shape, X and strike points. The goal is to robustly stabilize advanced configurations in TCV such as negative triangularity and snowflake plasmas.

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Date submitted: 03 Jul 2019

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