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Multi configuration axisymmetric plasma shaping control on RFX-mod R. CAVAZZANA, C. FINOTTI, G. MARCHIORI, G. MANDUCHI, L. ZANOTTO, O. KUDLACEK, M. ZUIN, P. FRANZ, P. ZANCA, L. MARRELLI, Consorzio RFX, Associazione Euratom-ENEA - 35127 Padova, Italy, T.C. LUCE, G.L. JACKSON, General Atomics, P.O. Box 85608, San Diego, California — RFX-mod is a flexible experiment, equipped with a full coverage MHD control system, composed by 192 (48 toroidal x 4 poloidal) coils. Being built as a high current RFP ($a/R = 0.46\text{m}/2.0\text{m}$; I_p max 2 MA) it has recently operated also as a low current circular tokamak ($B_t = 0.45$ T; I_p 85 kA @ $q(a) \sim 3$; I_p 150 kA @ $q(a) \sim 2$), achieving the full stabilization of $m=2, n=1$ mode at $q(a) \sim 2$. In order to extend the significance of MHD control experiments, there arose the need of creating non circular shaped discharges, exploiting the flexibility of the 16 shaping coils of the machine. Plasma of with moderate elliptical and triangular shape can be obtained both in tokamak and RFP configuration. Moreover tokamak D-shaped plasmas with double X-point have been obtained by proper reconfiguration of the power supply. The design structure and the experimental performance of the new shape reconstruction, plasma position and shape real-time control algorithms, tested in both RFP and tokamak configuration, are presented and discussed, along with some preliminary results of the MHD mode interaction and control behavior with the modified plasma shapes.

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