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Feedback control of $m = 0$ modes in the Reversed Field eXperiment G. SPIZZO, A. ALFIER, F. BONOMO, S. CAPPELLO, A. CRAVOTTA, D.F. ESCANDE, P. FRANZ, L. FRASSINETTI, L. MARRELLI, P. MARTIN, R. PASQUALOTTO, D. TERRANOVA, Consorzio RFX, Euratom-ENEA Association, Corso Stati Uniti 4, 35127 Padova - Italy — Recent theory and simulations have highlighted the role of tearing modes with poloidal mode number $m = 0$ and $m = 1$ in the edge of the reversed-field pinch (RFP)[1]. These results show that the nonlinear superposition of these modes allows for the formation of a chain of magnetic islands, responsible for a transport decrease in the region where the toroidal field B_ϕ vanishes and reverses direction. In particular, it has been demonstrated that the reduction of the total $m = 0$ island dimension (due to $m = 0$ modes and the beating of the $m = 1$'s) is beneficial in terms of transport. As a first step to this end, in the RFX-mod reversed-field experiment, we exploited the feedback control of the 12 toroidal sectors used for producing the toroidal field, so as to actively cancel the $m = 0$ mode amplitude. Indeed, experimental results show the reduction of $m = 0$ fluctuation amplitude, associated to an overall temperature increase, and a reduction and redistribution of plasma-wall interaction due to the mode phase locking.

[1]G. Spizzo, S. Cappello, A. Cravotta, D.F.Escande *et al.*, Phys. Rev. Lett. **96**, 025001 (2006).

Paolo Franz

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