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Electric potential and magnetic topology in RFX-mod boundary

P. SCARIN, M. AGOSTINI, G. SPIZZO, M. SPOLAORE, N. VIANELLO, Consorzio RFX, Padova - Italy — The boundary in the Reversed Field Pinch experiment RFX-mod ($R = 2$ m, $a = 0.46$ m) is dominated in the high current regime by the helical deformation induced by the dominant toroidal mode $m = 1, n = -7$. The outward deformation causes a local enhancement of the Plasma Wall Interaction with an electron pressure increase, a more negative floating potential and a higher particle influx. An analysis of the edge electric field, helical flow and coherent structures growing in the boundary, will be presented. The radial component of the electric field (fundamental in the plasma boundary), is obtained through the edge toroidal flow evaluation as results from the cross-correlation method applied to measurements of optical fluctuations and of floating potential. Our analysis is that a weakly chaotic edge magnetic topology produces a modification of the electron to ion relative diffusion (D_e/D_i), due to a larger electron transit time in correspondence to island X-points. The resulting ambipolar electric potential, which guarantees quasi-neutrality in a sheath next to the wall, exhibits a periodicity linked to the dominant island symmetry.

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