

Abstract Submitted
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Density limit, radiation and magnetic topology in the reversed-field pinch M.E. PUIATTI, S. CAPPELLO, F. CARRARA, P. SCARIN, G. SPIZZO, D. TERRANOVA, M. VALISA, B. ZANIOL, Consorzio RFX, Euratom-ENEA Association, Corso Stati Uniti 4, 35127 Padova - Italy — In this paper we analyze the density limit in the reversed-field pinch machine RFX-mod, whose upgrades (in particular, the new feedback control system¹) have greatly ameliorated plasma-wall interaction issues. In fact, when $n/n_G < 0.35$ (with n_G the Greenwald density), there is no signature of enhanced radiation outside the regions of the residual localized plasma-wall interaction. On the contrary, when $n/n_G > 0.35$ a localized enhancement of the radiation is observed, not necessarily associated to the region of maximum plasma-wall interaction. This localized radiation has the shape of a poloidal ring, and appears in correspondence to edge magnetic islands, originated from the MHD $m = 0$ modes (m is the poloidal mode number). Besides the local decrease of particle diffusivity D associated to the magnetic islands, the presence of highly radiating rings can be related to a reduction of the turbulent edge transport², which takes place approximately at the same values of n/n_G . In this respect, the microscopic cause of the density limit could be similar to the MARFE phenomenon in Tokamaks.

¹S.Martini and the RFX team, Nucl. Fusion **47**, 783 (2007).

²see P.Scarin, this conference.

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