Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Runaway electrons mitigation by 3D fields: new insights from ASDEX Upgrade and RFX-mod experiments. M. GOBBIN, Consorzio RFX, Padova, Italy, G. PAPP, Max-Planck-Institute for Plasma Physics, Garching, Germany, L. MARRELLI, Consorzio RFX, Padova, Italy, P.J. MCCARTHY, Department of Physics, University College Cork, Cork, Ireland , M. NOCENTE, Universitá di Milano-Bicocca, Milano, Italy, G. PAUTASSO, W. SUTTROP, Max-Planck-Institute for Plasma Physics, Garching, Germany, P. PIOVESAN, D. TERRANOVA, M. VALISA, Consorzio RFX, Padova, Italy — Disruption-generated runaway electron (RE) beams represent a severe threat for tokamak plasma-facing components, thus motivating the search of mitigation techniques. The application of optimized 3D fields might aid this purpose, as was recently investigated in ASDEX Upgrade and RFX-mod. In ASDEX Upgrade discharges, the application of n=1 resonant magnetic perturbations (RMPs) by the B-coils before and during the disruption results in a longer current quench time together with a lower RE current in the post-disruption phase. The strength of the observed effects depends on the upper-to-lower B-coil phasing, i.e. on the poloidal spectrum of the RMPs. These results are analyzed by means of numerical tools, like the guiding center code ORBIT, and the role of plasma response is also investigated. Similar experiments have been performed in RFX-mod low density plasmas where magnetic perturbations of various amplitudes, applied by non-axisymmetric coils, have been found to partially suppress REs. ORBIT simulations indicate, in this case, that RE orbit losses are associated to a raised level of stochasticity in the edge plasma region.

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Date submitted: 14 Jul 2016 Electronic form version 1.4