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Perturbative analysis of tearing mode saturation FULVIO MILITELLO, Politecnico di Torino, Torino, Italy, MAURIZIO OTAVIANI, CEA-Cadarache, St. Paul lez Durance, France, FRANCO PORCELLI, Politecnico di Torino, Torino, Italy, JIM HASTIE, Politecnico di Torino, Torino, Italy — New, rigorous analytic results for the tearing island saturation are presented. These results are valid for the realistic case where the magnetic island structure is non-symmetric about the reconnection surface and the electron temperature, on which the electrical resistivity depends, is evolved self-consistently with the island growth. The new equilibrium, represented by the saturated island, is constructed using a perturbation expansion which does not need an *Ansatz* on the shape of the magnetic field, since it takes into account self-consistently the complete harmonic structure of the mode in the nonlinear layer. The new terms in the Rutherford equation, which are obtained with this procedure, are likely to have an impact on the overall saturation level of NTMs.

Fulvio Militello
Politecnico di Torino, Torino, Italy

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