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PB3D: a new code for 3D ideal linear peeling-ballooning stability
TOON WEYENS, RAUL SANCHEZ, U. Carlos III de Madrid, GUIDO HUIJSMANS, ITER Organization, France, LUIS GARCIA, U. Carlos III de Madrid, ALBERTO LOARTE, ITER Organization, France — Ideal peeling-ballooning modes are important for magnetic nuclear fusion devices, but most of the theoretical and computational work that has been performed over the years to gain insight into their inner workings and consequences has been limited to axisymmetric (so-called 2D) cases which limits the range of applicability of the results. For example, the proposed use of perturbation coils in tokamaks to destabilize ELMS before they have a chance to grow dangerous has an inherently non-axisymmetric (3D) nature. Furthermore, many devices, such as stellarators, are intrinsically not axisymmetric. In this contribution we present a new code, PB3D (Peeling-Ballooning in 3D), that implements the equations of a previously developed theory [1] that overcomes these stringent limitations by making no use of an axisymmetric approximation. The first benchmarking results of PB3D, dealing with the investigation of the stability properties of magnetic equilibria with nested flux surfaces obtained numerically from multiple equilibrium codes, such as HELENA and VMEC, are presented here. The results will be compared with those of various axisymmetric stability codes.

[1] WEYENS, T., SANCHEZ, R., GARCIA, L., LOARTE, A., AND HUIJSMANS, G. T. A., Phys. Plasmas 21, 042507 (2014).

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