

Abstract Submitted
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Axisymmetric equilibria with pressure anisotropy and plasma flow¹ GEORGE THROUMOULOPOULOS, ACHILLEAS EVANGELIAS, University of Ioannina — A generalised Grad-Shafranov equation that governs the equilibrium of an axisymmetric toroidal plasma with anisotropic pressure and incompressible flow of arbitrary direction is derived. This equation includes six free surface functions and recovers known Grad-Shafranov-like equations in the literature as well as the usual static, isotropic one. The form of the generalised equation indicates that pressure anisotropy and flow act additively on equilibrium. In addition, two sets of analytical solutions, an extended Solovév one with a free boundary and an extended Hernegger-Maschke one for a plasma surrounded by a fixed boundary possessing an X-point, are constructed, particularly in relevance to the ITER and NSTX tokamaks. Furthermore, the impacts both of pressure anisotropy and plasma flow on these equilibria are examined. It turns out that depending on the maximum value and the shape of an anisotropy function, the anisotropy can act either paramagnetically or diamagnetically. Also, in most of the cases considered both the anisotropy and the flow have stronger effects on NSTX equilibria than on ITER ones.

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