

Abstract Submitted
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MHD equilibria with incompressible flows: symmetry approach

GIAMPAOLO CICOGNA, University of Pisa Italy and INFN, FRANCESCO PEGORARO, University of Pisa Italy — We identify and discuss a family of azimuthally symmetric, incompressible, magnetohydrodynamic plasma equilibria with poloidal and toroidal flows in terms of solutions of Generalized Grad Shafranov (G-GS) equation. These solutions are derived by exploiting the incompressibility assumption, which allows us to rewrite the G-GS equation in the form of a GS equation in terms of a new dependent variable, and the continuous Lie symmetry properties of the resulting equation and in particular a special type of “weak” symmetries. This procedure allows us to construct a family of D shaped MHD equilibrium configurations with both toroidal and poloidal flows. Here we present the simplified case without poloidal flow, in which case the new dependent variable coincides with the standard flux function, and discuss the effect of the gradient of the centrifugal term on the equilibrium configuration.

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