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Variational moments solution of the anisotropic axisymmetric equilbrium problem

Pressure anisotropy due to auxiliary heated fast ions or runaway electrons can significantly impact the macroscopic magnetic equilibrium. Moreover, since the plasma toroidal diamagnetism is predominantly impacted by the perpendicular pressure, measurements of the outside poloidal magnetic field combined with measurements of the toroidal flux allow to distinguish between both components, as shown in [1]. In scenarios of predominantly parallel anisotropy, inverse aspect ratio asymptotic expansions of the equations predict a weak impact on the overall geometry. Moreover, standard derivations of force balance in the presence of energetic particles assume a prescribed shape for their distribution function such as the modified bi-Maxwellian [2], and employ the trace limit to neglect them in the quasineutrality. It is thus necessary to assess whether the latter effects are indeed negligible with respect to the parallel anisotropy.

Author: VAN PARYS, Guillaume (Swiss Plasma Center - EPFL)

Co-authors: MERLE, Antoine Pierre Emmanuel Alexis;   HEISS, Cosmas;   GRAVES, Jonathan (EPFL SPC)

Presenter: VAN PARYS, Guillaume (Swiss Plasma Center - EPFL)

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