Abstract Submitted
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Anisotropic pressure effects on magnetospheric MHD equilibrium[1] M. FURUKAWA, Grad. Sch. Eng., Tottori University — We have studied effects of anisotropic pressure on magnetospheric MHD equilibrium analytically and numerically. The plasma is confined by only poloidal magnetic field generated by an internal ring current. The anisotropic pressure is assumed to be the CGL tensor form [1]. The diamagnetic current has two components; (i) the one remains at isotropic pressure and (ii) the other arises due to pressure anisotropy. Note that both components flow in the toroidal direction in this configuration. If the perpendicular pressure ($p_\perp$) is larger than the parallel pressure ($p_\parallel$), (i) and (ii) flow in the opposite direction in wide region of the confinement. Thus the change of magnetic field from the vacuum field is reduced even at high beta[2]. We have also examined beta limit. It can exceed unity locally. Especially when $p_\parallel > p_\perp$, the beta limit can be explained by using the analytic expression of diamagnetic current.

[1] G. F. Chew et al, Proc. R. Soc. London Ser. A 236, 112 (1956).
[2] M. Furukawa, The 12th Asia Pacific Physics Conference of AAPPS (Makuhari Messe, Chiba, Japan, July 2013), D1-PWe-01.

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