confinement of the Stable anisotropic plasmas at magnetic configurations with a convex-concave field lines

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It has been shown that a combination of the convex and the concave part of a field line provides a strong stabilizing action against convective (flute-interchange) plasma instability [Tsventoukh 2011 *Nucl. Fusion* **51** 112002]. This results in internal peaking of the stable plasma pressure profile that is calculated from the collisionless kinetic stability criterion for any magnetic confinement system with combination of mirrors and cusps. Connection of the convex and concave field line parts results in a reduction of the space charge that drives the unstable E×B motion, as there is an opposite direction of the particle drift in a non-uniform field at convex and concave field lines. The pressure peaking arises at the minimum of the second adiabatic invariant J that takes place at the ‘middle’ of a tandem mirror-cusp transverse cross-section. The position of the minimum in J varies with the particle pitch angle that results in a shift of the peaking position depending on plasma anisotropy. This allows one to improve a stable peaked pressure profile at a convex-concave field by changing the plasma anisotropy over the trap cross-section. Examples of such anisotropic distribution functions have been found that give an additional substantial enhancement in the maximal central pressure. Furthermore, the shape of new calculated stable profiles has a wide central plasma layer instead of a narrow peak.

Work was supported in part by RFBR grants # 12-08-33031 and 13-08-01397