

# Stabilizing impact of $\beta'$ on microturbulence

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The impact of high absolute value of the radial gradient of  $\beta$  ( $|\beta'|$ ) on microstability is found to be stabilizing. The microstability analyses are performed by a linear gyrokinetic flux tube code, GS2, using computed magnetic equilibrium. All types of drift modes (ITG, TEM, ETG) are ultimately stabilized by high values of  $|\beta'|$ . Indeed, as in presence of a low or negative magnetic shear, the curvature and grad(B) drifts driving interchange-like instabilities are strongly reduced by high  $|\beta'|$ . Therefore, high values of  $|\beta'|$  induce a temperature and density peaking leading to even higher  $|\beta'|$ . As in the case of the  $\vec{E} \times \vec{B}$  shear stabilization, there is a possibility for entering a positive feedback loop. In the high  $\beta$  NSTX plasmas, high  $|\beta'|$  are believed to be responsible for lower growth rates rather than the low aspect ratio. The stabilizing impact of high  $|\beta'|$  might also be relevant in low  $\beta$  tokamak plasmas when a locally steep pressure gradient is obtained in internal transport barrier discharges.