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Error field, torque, and plasma rotation[1] L.J. ZHENG, M. KOTSCHENREUTHER, J.W. VAN DAM, F. WAELBROECK, Institute for Fusion Studies, University of Texas - Austin — By calculating the torque on the error field coil structure, which is opposite to the torque exerting on the plasma, we find that the error-field-induced torque (τ_ϕ) can be expressed explicitly as the imaginary part of $\mathbf{j}^\dagger \mathcal{F}_1^{-1}(\delta W_b/\delta W_\infty)\mathcal{F}_2\mathbf{j}$, where $\mathbf{j}$ specifies the strength of the error field, δW_b and δW_∞ represent, respectively, the energy integrals with perfectly conducting wall and without wall, and $\mathcal{F}_1$ and $\mathcal{F}_2$ are regular equilibrium matrices. The kinetic version of the AEGIS code is being developed to calculate the torque in the numerically constructed equilibria. Experimental observations from DIII-D, JET, and C-Mod are examined and compared to our theoretical prediction based on the above torque expression. We will clarify the relationship between error field, torque, and plasma rotation.

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