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Effect of Helical Field Perturbations on Fast-Ion Confinement in the DIII–D Tokamak[1] E.M. CAROLIPIO, W.W. HEIDBRINK, University of California, Irvine, C.B. FOREST, University of Wisconsin, Madison, R.B. WHITE, Princeton Plasma Physics Laboratory — Instabilities or external coils can create long-wavelength helical fields that degrade fast-ion confinement. To study this phenomenon, data from three DIII–D experiments are compared with theoretical calculations. In one study, external error-field coils were energized and the effect on the "burnup" of fusion products was measured. In other experiments, beam ions were monitored in plasmas with large tearing modes and in plasmas with TAE activity. In the analysis, the amplitude and structure of the perturbations are inferred from theoretical modeling and experimental data. Also, numerical codes are used to reconstruct the equilibrium, calculate the fast-ion distribution function, and compute the distribution of lost fast-ions. Predicted losses are compared with experimental data. Preliminary analysis indicates that, for the TAE case, the eigenfunction predicted by ideal MHD cannot account for measured losses and, for the tearing-mode case, the transport is caused by intrinsic orbit stochasticity.

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