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Error Field Physics and Correction at High Beta in NSTX STEFAN GERHARDT, JON MENARD, JONG-KYU PARK, RON BELL, DAVE GATES, BENOIT LEBLANC, PPPL, STEVE SABBAGH, Columbia Univ., HOWARD YUH, Nova Photonics — NSTX experiments over the past two years have made progress in understanding the physics and correction of both resonant and non-resonant error fields (EFs). By varying the amplitude and phase of an applied n=3 field, it has been demonstrated that there is an intrinsic n=3 EF. The EF source has been isolated to the main vertical field coil by experimentally determining the optimal correction for various values of plasma current, toroidal field, and elongation. This coil is measured to be slightly out of round, producing a dominantly n=3 EF; both vacuum field and neoclassical toroidal viscosity torque calculations indicate a correcting field similar in magnitude and phase to the experimental correction. Measurements of n=1 EF penetration at high-beta show that the critical error field for driving an island is substantially smaller than the standard density scaling would predict. The critical role of the high-beta plasma response in determining the penetration threshold will be discussed, using results from the IPEC code. This research is funded by the US Department of Energy contract # DE-AC02-09CH11466.

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