IMPACT OF PF AND TF COIL MISALIGNMENT ON m=2, n=1 PLASMA ERROR FIELDS IN TPX*

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Error fields from misalignment of the toroidal field (TF) and poloidal field (PF) coils in TPX are presented in terms of the outward normal B-field (B), expanded in poloidal and toroidal harmonics (m, n), on a simulated, dee shaped, plasma flux surface. Results are reported for n=1 toroidal mode number and low poloidal mode numbers, m, and for various displacements of TF and PF coils. In particular, results are given for the **m,n = 2,1** error field which is important in the generation of locked modes.[1] Based on existing experiments, maximum permissable field errors are 4 G for the 2,1 mode and 8 G for the n=1; m=1,3,4 modes. Results are presented for a rigid shift and rotation of a single TF coil and for a rigid, radial shift of each PF coil. The resulting influence matrix can be used to obtain results for combinations of misaligned coils which can be expected from manufacturing and construction tolerances. Vector addition of the individual coil results, using the magnitude and phase of the each component, is used to determine the effect of a rigid shift of the solenoid relative to the plasma flux surface. Results indicate that positional tolerances would be severe without the addition of saddle loop coils which are designed to compensate for low order error fields. The results, in conjunction with manufacturing tolerances, can be used to specify requirements for the saddle loop coils required for error field correction.

[1]La Haye, R.J., Fitzpatrick, R., Hender, T.C., Morris, A.W., Scoville, J.T., and Todd, T.N., Phys. Fluids B **4**, 2098 (1992).

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