

Abstract Submitted  
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**Inverse methods for stellarator error-fields and emission** K. C. HAMMOND, A. ANICHOWSKI, P. W. BRENNER, R. DIAZ-PACHECO, F. A. VOLPE, Y. WEI, Columbia University, Y. KORNBLUTH, MIT, T. S. PEDERSEN, IPP Greifswald, S. RAFTOPOULOS, PPPL, P. TRAVERSO, Auburn University — Work at the CNT stellarator at Columbia University has resulted in the development of two inverse diagnosis techniques that infer difficult-to-measure properties from simpler measurements. First, CNT's error-field is determined using a Newton-Raphson algorithm to infer coil misalignments based on measurements of flux surfaces. This is obtained by reconciling the computed flux surfaces (a function of coil misalignments) with the measured flux surfaces [1]. Second, the plasma emissivity profile is determined based on a single CCD camera image using an onion-peeling method. This approach posits a system of linear equations relating pixel brightness to emission from a discrete set of plasma layers bounded by flux surfaces [2]. Results for both of these techniques as applied to CNT will be shown, and their applicability to large modular coil stellarators will be discussed. [1] K. C. Hammond *et al.*, Plasma Phys. Control. Fusion **58**, 074002 (2016) [2] K. C. Hammond *et al.*, Rev. Sci. Instrum., in press (arXiv:1606.03151)

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