Enhancements, Parallelization and Future Directions of the V3FIT 3-D Equilibrium Reconstruction Code[1] M.R. CIANCIOSA, J.D. HANSON, D.A. MAURER, G.J. HARTWELL, M.C. ARCHMILLER, X. MA, J. HERFINDAL, Auburn University — Three-dimensional equilibrium reconstruction is spreading beyond its original application to stellarators. Three-dimensional effects in nominally axisymmetric systems, including quasi-helical states in reversed field pinches and error fields in tokamaks, are becoming increasingly important. V3FIT is a fully three dimensional equilibrium reconstruction code in widespread use throughout the fusion community. The code has recently undergone extensive revision to prepare for the next generation of equilibrium reconstruction problems. The most notable changes are the abstraction of the equilibrium model, the propagation of experimental errors to the reconstructed results, support for multicolor soft x-ray emissivity cameras, and recent efforts to add parallelization for efficient computation on multi-processor system. Work presented will contain discussions on these new capabilities. We will compare probability distributions of reconstructed parameters with results from whole shot reconstructions. We will show benchmarking and profiling results of initial performance improvements through the addition of OpenMP and MPI support. We will discuss future directions of the V3FIT code including steps taken for support of the W-7X stellarator.

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