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3D diagnostic mapping for turbulence studies with magnetic islands in DIII-D[1] L. A. MORTON, UW - Madison, M. R. CIANCIOSA, M. W. SHAFER, ORNL, D. M. KRIETE, UW - Madison, T. E. EVANS, General Atomics, D. J. DEN HARTOG, G. R. MCKEE, UW - Madison — The study of turbulence and transport in 3D magnetic topology is difficult but highly relevant for stellarators as well as nominally axisymmetric configurations (including tokamaks and reversed-field pinches) with non-axisymmetric perturbations. Recently gyrokinetic and gyrofluid simulations have been applied to study turbulence in the vicinity of magnetic islands in tokamaks. To facilitate comparisons, we are employing V3FIT with SIESTA to reconstruct a large applied magnetic island in DIII-D. 3D reconstruction enables mapping together diagnostic quantities from multiple spatial locations around the device. V3FIT/SIESTA provides 3D kinetic pressure constrained by Thomson Scattering and Soft X-ray diagnostics, which will enable detailed spatial comparison of pressure gradients versus density fluctuations measured with Beam Emission Spectroscopy. Preliminary analysis indicates that the turbulence intensity is peaked near (but offset from) the X-point, and reduced in the O-point, in qualitative agreement with the results of simulations and simple theoretical arguments relating gradients, fluxes, and fluctuations. The modification of the flow profile and shear by the island could also be contributing to the observed turbulence spatial distribution.

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