Abstract Submitted
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Use of Uncertainty Quantification Techniques for Interpretive and Predictive Transport Analysis of Burning Plasmas[1] ALEXEI PANKIN, Tech-X Corporation (Boulder, CO), MASAYUKI YOKOYAMA, RYOHSUKE SEKI, CHIHIRO SUZUKI, National Institute for Fusion Science (Toki, Japan), ARNOLD KRITZ, TARIQ RAFIQ, Lehigh University (Bethlehem, PA) — Development of the uncertainty quantification (UQ) and sensitivity analysis (SA) techniques in the applied mathematics community brings new opportunities in the analysis, interpretation and validation of experimental data as well as in the development of new discharge scenarios in predictive transport modeling. The UQ techniques have been recently used to develop a new validation method for predictive transport codes [A.Y. Pankin *et al.* Phys. Plasmas 20 (2013) 102501]. In this research, the use of UQ and SA techniques is extended to the interpretive analysis of experimental data. The progress achieved in implementing UQ methods in the TASK3D-a1 code is described. TASK3D-a1 is a suite of codes for the interpretive transport analysis of LHD experimental data. The DAKOTA toolkit for calculating UQ is implemented in TASK3D-a1, and it is used to investigate the effects related to the instrumental errors and numerical errors resulting from the interpolation of experimental data. The uncertainties in the computation of effective diffusivities and in the verification of the energy and momentum balances associated with these two types of errors are evaluated. The possible application of these techniques for other interpretive modeling codes such as TRANSP and ONETWO is discussed.

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