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Application of 3D Synthetic Reflectometry Diagnostics to Comparing Results from PIC Simulations with Reflectometry Measurements in NSTX[1] LEI SHI, AHMED DIALLO, GERRIT KRAMER, SEUNG-HOE KU, WILLIAM TANG, ERNEST VALEO, Princeton Plasma Phys Lab — Synthetic diagnostics are powerful tools to connect advanced numerical simulations with experimental measurements. They can be used for validation studies of the simulations as well as providing insights for experimental observations. Since individual synthetic diagnostic codes are usually developed independently from predictive simulation codes, interfacing them is a significant task. In this talk, we will report on new results obtained from interfacing a recently-developed 3D synthetic reflectometry code (FWR3D) - as well as the well-established 2D version (FWR2D) – against the global particle-in-cell (PIC) code - XGC1 - generally regarded as the most advanced integrated edge/core code that is characterized by high phase-space and coordinate-space resolution including complex separatrix geometry in the edge region of tokamak plasmas. The simulation results are compared with the reflectometry signals measured between an edge localized mode (ELM) cycle in an actual NSTX discharge. Associated findings regarding to what degree the features observed by the actual reflectometry diagnostic deployed in the experiment are reproduced will be reported. In addition, information from the XGC-1 code on the characteristics and spectral properties of the turbulence will be provided.

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