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Toward the application of the Parareal algorithm to 5D gyrokinetic plasma turbulence JOSE M. REYNOLDS BARREDO, University of Alaska, USA and Universidad Carlos III de Madrid, SPAIN, DAVID E. NEWMAN, University of Alaska, USA, RAUL SANCHEZ, Universidad Carlos III de Madrid, SPAIN, DEBASMITA SAMADDAR, ITER, Cadarache, France, LEE A. BERRY, WAEL ELWASIF, ORNL, USA — It has been shown that fully-developed plasma turbulence can be successfully parallelized in time using the Parareal algorithm [D. Samaddar et al, J. Comp. Phys. 229, 6558 (2010)]. Here, a detailed analysis of the error evolution is done in order to obtain a deeper understanding of the mechanisms of convergence. The analysis is done for slab 2D plasma drift wave turbulence in the case of long wavelengths [D.E. Newman et al, Phys. Fluids B 4, 599 (1992)] for two types of non-linearities: ExB and polarization. Some suggestions are put forward in order to understand why ExB nonlinearity has better convergence rate than the polarization one. The same technique is applied to gyrokinetic plasma turbulence simulated with GENE code [F. Jenko et al, Phys. Plasmas 7, 1904 (2000)] in order to study the applicability of Parareal to this kind of turbulence simulation, and first results of Gene simulations using the recently released IPS event based platform of Parareal are shown.

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