Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Stellarator Microinstability and Turbulence Simulations Using Gyrofluid (GryfX) and Gyrokinetic (GS2) Codes MIKE MARTIN, MATT LANDREMAN, Univ of Maryland-College Park, NOAH MANDELL, Princeton Plasma Physics Laboratory, WILLIAM DORLAND, Univ of Maryland-College Park — GryfX is a delta-f code that evolves the gyrofluid set of equations using sophisticated nonlinear closures, with the option to evolve zonal flows (ky=0) kinetically. Since fluid models require less memory to store than a kinetic model, GryfX is ideally suited and thus written to run on a Graphics Processing Unit (GPU), yielding about a 1,200 times performance advantage over GS2. Here we present the first stellarator simulations using GryfX. Results compare linear growth rates of the Ion Temperature Gradient (ITG) mode between GryfX and the gyrokinetic code, GS2, using stellarator geometries from the National Compact Stellarator Experiment (NCSX) and Wendelstein 7-X (W7X). Strong agreement of <10% for maximum growth rates is observed between GS2 and GryfX for temperature gradients away from marginal stability for both NCSX and W7X geometries. Nonlinear stellarator results using GS2/GryfX are also presented.

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Date submitted: 20 Jul 2016 Electronic form version 1.4