Abstract Submitted
for the APR12 Meeting of
The American Physical Society

Neoclassical and Initial Divertor-Geometry Tests of COGENT[1]
R.H. COHEN, M. DORF, J.C. COMPTON, M. DORR, T.D. ROGNLIEN, LLNL, P. COLELLA, P. MCCORQUODALE, LBNL, J. ANGUS, S. KRASHENINNIKOV, UCSD — COGENT is a full-f continuum kinetic code being developed for study of edge physics phenomena in tokamaks. The code is distinguished by 4th order conservative discretization and mapped multiblock grid technology to handle the geometric complexity of the tokamak edge. We discuss a number of recent neoclassical results in closed-flux-surface geometry, in particular self-consistent neoclassical simulations with increasingly complete collision operators (Lorentz, full test-particle, and adding model momentum- and energy-conserving terms). We also examine the effects of strong radial electric fields on neoclassical transport and decay of geodesic acoustic modes (GAM's). The code is being upgraded to full single-null divertor geometry, with numerical geometric coefficients imported from an external MHD equilibrium calculation. We discuss several initial tests of the divertor code: advection of phase-space blobs through the x-point region, and neoclassical transport and flows in the presence of divertor losses. We also summarize progress on code-development activities needed to complete the divertor code.

[1]Work performed for USDOE, at LLNL under contract DE-AC52-07NA27344

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Date submitted: 05 Jan 2012 Electronic form version 1.4