Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Numerical Methods for Nonlinear Fokker-Planck Collision Operator in TEMPEST[1] G. KERBEL, Z. XIONG, LLNL — Early implementations of Fokker-Planck collision operator and moment computations in TEMPEST used low order polynomial interpolation schemes to reuse conservative operators developed for speed/pitch-angle (v, θ) coordinates. When this approach proved to be too inaccurate we developed an alternative higher order interpolation scheme for the Rosenbluth potentials and a high order finite volume method in TEMPEST (ϵ, μ) coordinates. The collision operator is thus generated by using the expansion technique in (v, θ) coordinates for the diffusion coefficients only, and then the fluxes for the conservative differencing are computed directly in the TEMPEST (ϵ, μ) coordinates. Combined with a cut-cell treatment at the turning-point boundary, this new approach is shown to have much better accuracy and conservation properties.

[1]Work performed under the auspices of the USDOE through contract No. W-7405-ENG-48 at UC LLNL

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Date submitted: 24 Jul 2006 Electronic form version 1.4