Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Comparing the Fluid and the Kinetic Approaches to Collisional Angular Momentum Transport[1] S.K. WONG, San Diego Mesa College, V.S. CHAN, General Atomics — Collisional transport of tokamak plasmas can be investigated using a fluid or a kinetic approach, both of which start from the kinetic equation, but employ differing orders of expansions in the small parameters of gyro-radius over scale length and collision frequency over gyro-frequency. In the fluid approach, a closed description is first obtained for local moment equations. The kinetic approach achieves closure only for flux surface averaged moment equations, but has the advantage of being applicable to long mean-free-path regimes. It was noted recently [1] that although the two approaches yield identical results for particle and heat fluxes in the Pfirsch-Schluter regime, they do not for the angular momentum flux, mainly because of incompleteness in the kinetic approach. The work being reported revisits both approaches and attempts to reconcile the difference in the results if any, and casts the angular momentum flux into a closed form involving flux averaged density, temperature, and electric potential.

[1] P.J. Catto and A.N. Simakov, Phys. Plasmas **12**, 012501 (2005).

[1]Work supported by US DOE under DE-FG03-95ER54309.

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Date submitted: 21 Jul 2006 Electronic form version 1.4