Self-Consistent evolution of radial electric field in a low flow ordered drift kinetic system[1] W. SENGUPTA, A.B. HASSAM, T.M. ANTONSEN, University Of Maryland College Park — We present a closed set of low collisionality drift kinetic equations which are full-f, nonlinear, with arbitrary geometry, electromagnetic with arbitrary beta, with ExB flow of order the diamagnetic flow, and with time variations ordered as second order in gyro-radius expansion. Our equations can be applied to the tokamak edge including evolution of the profiles. As has been pointed out by Parra et.al [1-2], we show that in order to self-consistently evolve the radial electric field, second order terms need to be retained. The complete set involves evolution of f, the magnetic field, and the ExB flow. We shall compare our drift kinetic system with the Gyrokinetic system developed by Calvo-Parra [2]. We shall also discuss the effects of the higher order corrections on the Rosenbluth-Hinton residual Zonal flows.

[1] Parra, F. I., & Catto, P. J. (2008). *Plasma Physics and Controlled Fusion*, 50(6), 065014.
[2] Calvo, Ivan, and Felix I. Parra. *Plasma Physics and Controlled Fusion* 54.11 (2012): 115007.

W. Sengupta
University Of Maryland College Park