Abstract Submitted for the DPP01 Meeting of The American Physical Society

Sorting Category: 5.6.2 (Theory/Computational)

S.C. Chiu

Finite Orbit Effects in a Rotating Tokamak Plasma¹

S.C. CHIU, Sunrise R&M, Inc., V.S. CHAN, General Atomics — Close to the tokamak axis, the particle orbit widths are not small compared with the minor radius, and the usual assumption of thin orbit widths breaks down. A previous analysis of finite orbits in a stationary plasma² has indicated significant deviations of phase space topology from thin orbit theory. In the present work, it is shown that the phase space topology of a rotating tokamak plasma is significantly different from a stationary plasma. Specifically, there exists a region at low energies where particles are trapped at all pitch angles. More significantly, the trapped passing boundary can disappear for co-moving particles within a certain radius when the rotation speed or rotation shear exceeds some thresholds. The implications of these effects on transport are discussed. The orbit widths are calculated as functions of phase space parameters. The transport of particles at low collisionality is estimated and the scaling is discussed. The effect of adding rf heating shall also be discussed.

¹Work supported by the US DOE under Grant DE-FG03-95ER54309. ²S.C. Chiu, V.S. Chan, Bull. Am. Phys. Soc. **45**, 51 (2000) paper BP1-132.

Prefer Oral SessionPrefer Poster Session	chiu@fusion.gat.com Sunrise R&M, Inc.
Special instructions: Poster 18, Transport, Boundary Plasma	

Date submitted: July 20, 2001 Electronic form version 1.4