

Abstract Submitted  
for the DPP15 Meeting of  
The American Physical Society

**Beyond the standard plasma transport theory**<sup>1</sup> T.M. BIRD, J.M. CANDY, GA — The standard approach to transport in strongly magnetized plasmas, based upon an expansion in the gyro-radius over magnetic field scale length, has an illustrious, and successful history. It is however not a complete theory for plasma transport, and a number of phenomena which fall outside of its purview have recently attracted interest. The assumptions needed to derive the entire transport theory have only recently been explicitly laid out. Many of these assumptions are likely not widely appreciated, and the consequences of using the standard tools of transport theory to address phenomena which do not obey them are rather unclear. We discuss the consequences of these assumptions, and then turn our attention to the task of overcoming them. An avant-garde approach to modifying the standard theory to incorporate new physics will be introduced and applied to the loss of thermal ions in the edge. We study how the plasma remains quasi-neutral in the presence of this non-ambipolar transport, and consider the collisional re-filling of the loss cone. We will also briefly discuss other phenomena of interest that could be addressed using these techniques.

<sup>1</sup>Work supported in part by US DOE under grant number DE-FC02-06ER54873.

T.M. Bird  
General Atomic

Date submitted: 22 Jul 2015

Electronic form version 1.4