Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Driven steady states and neutral-induced dynamics in flowing plasmas. ELENA L. MITRA, CUNY-Hunter College, PPPL, ELIJAH J. KOLMES, MIKHAIL E. MLODIK, IAN E. OCHS, NATHANIEL FISCH, TAL RUBIN, PPPL — The collisional transport of particles, momentum, and heat in magnetized plasmas, even in a slab geometry, exhibits rich dynamics. A new code, MITNS, has been recently created to explore these dynamics. In its current form, however, the code has reflecting boundary conditions, and no sources or sinks of particles or heat—it thus can only model an isolated system, in its approach to thermodynamic equilibrium. In plasma applications and experiments, however, we are often examining a driven steady state: for instance, in linear discharges, an energy source constantly heats the gas in a chamber to produce a hot plasma. Modeling such scenarios requires the inclusion of source terms and non-reflecting boundary conditions. These will be added to the code, and the resulting steady-states analyzed, with a particular focus on rotating plasmas. As a possible extension, sources consistent with the ionization of neutrals will be added, since neutral-induced charge transport is critical in understanding the rotation profiles of many laboratory devices.

Elena Mitra
CUNY-Hunter College, PPPL

Date submitted: 01 Jul 2020 Electronic form version 1.4