Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Fokker-Planck transport modelling for RF-heated plasmas in open magnetic geometries* [1] JUAN F CANESES MARIN, ATUL KUMAR, LOUIS WONELL, DAVID GREEN, CORNWALL LAU, DONALD BATCHELOR, RICHARD GOULDING, Oak Ridge National Lab — Recent interest in radio frequency (RF) heating in plasma devices with open magnetic geometries in both low temperature (˜10 eV) and high temperature (˜1 keV) plasmas has motivated the development and use of 3-dimensional Fokker-Planck solvers : 2 velocity dimensions and 1 dimension in physical space along the magnetic flux. Specific examples of low and high-temperature plasma devices that can benefit from such capability are the MPEX and WHAM devices to be built at ORNL and UW-Wisconsin respectively. We describe recent efforts at ORNL on Fokker-Planck transport modelling for RF-heated plasmas in open geometries using both particle-based methods and continuum approaches. We describe details of the various approaches and present an overview of the latest results. The effect of magnetic field profiles on electron parallel transport is investigated for the upcoming device MPEX. In addition, the process of generating/sustaining sloshing ions in devices such as the WHAM is discussed. Finally, full-wave modelling in warm plasmas is presented to discuss the merits of different heating schemes in such devices and the impact on velocity-space transport.

[1]This work was supported by the US. D.O.E. contract DE-AC05-00OR22725 and sponsored by the Laboratory Directed Research and Development Program of Oak Ridge National Laboratory, managed by UT-Battelle, LLC, for the U. S. Department of Energy."

Juan F Caneses Marin
Oak Ridge National Lab

Date submitted: 29 Jun 2020 Electronic form version 1.4