Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Feasibility of inferring the full fast-ion distribution function via Orbit Tomography at the DIII-D Tokamak[1] L. STAGNER, W.W. HEIDBRINK, UC Irvine — The sensitivity of fast-ion diagnostics to different regions of the fast-ion distribution (FID) phase space can be calculated. These phase space sensitivities when convolved with a local FID gives the expected experimental measurement. This process can be reversed to reconstruct the local FID from many experimental measurements in a method known as Velocity-space Tomography (VST). However, VST requires many radially overlapping measurement volumes which limits its applicability since most existing diagnostics are setup as radially separated arrays. Orbit Tomography (OT), an extension of VST that allows for the inference of the full FID, has been proposed as a solution to this problem. Unlike VST which reconstructs the fast-ion density on a 2D energy-pitch grid, OT infers the number of fast-ions on a particular orbit. This naturally correlates different radial locations allowing for any viewing chord to be used in the analysis. In the present work we will give an overview of OT and demonstrate its feasibility with the current diagnostic capability of the DIII-D tokamak.

[1]Work supported by the US DOE under Award DE-FC02-04ER54698.

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Date submitted: 11 Jul 2016 Electronic form version 1.4