Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

**Validation of TGLF-EP+Alpha model of Alfvén Eigenmode induced transport with the Imaging FIDA diagnostic on DIII-D**[1] CLAUDIO MARINI, Oak Ridge Assoc Univ, CAMI COLLINS, General Atomics, ERIC BASS, UCSD, WILLIAM HEIDBRINK, UCI, CRAIG PETTY, MICHAEL VAN ZEELAND, General Atomics, DANIEL LIN, UCI, LUKE STAGNER, General Atomics
— A reduced critical-gradient model for transport of energetic particles (EPs) by Alfvén Eigenmodes (AEs), constituted by the combination of TGLF-EP and Alpha codes, is tested against DIII-D L-mode discharges, where the EP population is measured with a new high resolution Imaging Fast Ion D-Alpha (I-FIDA) diagnostic. The outstanding spatial resolution of the I-FIDA diagnostic enables detailed comparisons to the transported EP profile and critical gradient threshold predicted by the model. The I-FIDA system measures a portion of the fast-ion population, generating 2D images with $\leq$2 mm resolution of the co-passing EPs in the energy range E$\simeq$40-80 keV with integration time $\geq$ 5 ms. A beam modulation technique is employed to extract the active part of the FIDA signal, limiting the profile measurement rate to $\leq$ 50 Hz. To compare measurements to the model, the EP diffusion coefficient profile computed by TGLF-EP+Alpha is input to the TRANSP (NUBEAM) code to compute the fast-ion distribution, which is processed by the FIDASIM code to generate synthetic diagnostic signal. Trends in the critical gradient threshold predicted by the model will be tested experimentally in L-mode discharges for a range of parameters, including magnetic shear and EP profiles and fraction.

[1]Work supported by US DOE contracts DE-FC02-04ER54698 and DE-FG03-94ER54271.

Claudio Marini
Oak Ridge Assoc Univ

Date submitted: 28 Jun 2020 Electronic form version 1.4