Abstract Submitted
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Development of coupled DTRAN/CQL3D codes for runaway electron quench studies[1] A.YU. PIGAROV, R.W. HARVEY, CompX, YU.V. PETROV, E.M. HOLLMANN, UCSD — Generation and kinetic transport of runaway electrons (RE) in disruption and disruption mitigation events depend strongly on the rapid change in the plasma parameters, impure plasma ion composition, and electro-magnetics, whereas the RE in turn have crucial impact on plasma current, plasma conductivity and heating. For self-consistent plasma/RE studies, we are developing DTRAN/CQL3D package, in which kinetic Fokker-Planck code CQL3D is coupled to macroscopic plasma transport code DTRAN. This is a multi-element, multispecies, 1-D (radially), magnetic flux surface averaged parameters, diffusive-convective transport code. The code solves a system of strongly coupled equations reproducing the dynamics of plasma electrons, ions, parallel electric field, ionization states of various intrinsic and extrinsic impurity species, neutral atoms and molecules. Capability of DTRAN to simulate low-temperate (down to sub-eV in afterglow phase) partially-ionized plasmas including molecular effects (MAR), interchange ion reactions, increasing ion conversion) and plasma radiation opacity of many lines will be highlighted. Results of DTRAN benchmark against DIII-D experimental data for disruption mitigation with Argon and D2 gas puffs will be presented

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