Abstract Submitted
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Validations of BOUT++ transport simulations with HL-2A experiments using SMBI Z.H. WANG, SWIP, X.Q. XU, LLNL, D.L. YU, A.P. SUN, J.Q. DONG, L.H. YAO, SWIP — In BOUT++ code framework, a new transneut module has been developed to deal with neutrals and plasmas transport during fueling of super-sonic molecule beam injection (SMBI) or gas puffing (GP) [1]. It modifies BOUT++ code of boundary plasma turbulence to study dynamics of neutrals transport and interactions with plasma during fueling. The model couples plasma density, heat and momentum transport equations with neutrals density and momentum transport equations for atoms and molecules. Particle interactions of dissociation, ionization, recombination and charge-exchange have been included. Particle recycling is also considered at both wall and divertor plates. A local molecule flux boundary condition is applied to model SMBI. It is found that neutrals can penetrate deeply across the separatrix. Simulations are done in a realistic HL-2A tokamak geometry. The initial profiles are specified same as the experiment and they are kept stable via radial dependent diffusion coefficients. The simulations of penetration depth and mean profiles during SMBI will be validated with HL-2A experiments. This work supported by NSFC, Grant No. 11205053 and US DOE under DE-AC52-07NA27344.

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