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Numerical SOLPS-ITER study of the effect of fueling on neutral density profiles in high opacity H-modes on Alcator C-Mod[1] RICHARD REKSOATMODJO, SASKIA MORDIJCK, College of William Mary, JERRY HUGHES, MIT PSFC, JEREMY LORE, ORNL, XAVIER BONNIN, ITER Organization, C-MOD COLLABORATION — The role of neutrals in setting density pedestal structure was evaluated in experiments on Alcator C-Mod, in H-mode regimes approaching ITER-like edge neutral opacities. Enhanced D-alpha H-modes at high plasma and power densities were realized at moderate and high current to give an opacity scan, with wall recycling neutrals only, as well as with supplemental gas puffing. To assess the role of fueling versus transport at the plasma edge, we use the SOLPS-ITER code suite to first calculate the radial and poloidal neutral density profiles for discharges at varying density. We initially match the upstream experimental radial fluxes as well as density and temperature profiles by varying the radial transport coefficients in SOLPS-ITER. A simple ballooning transport model is implemented to break the poloidal symmetry of the neutral density distribution around the vessel. Simulations of the neutral density in the higher opacity discharge exhibit more resistance to the effects of ballooning transport when compared to simulations of the lower opacity discharge. Neutral gas puff sources are being implemented in the model to further probe neutral transport dynamics into and along the opaque SOL, including near the divertor targets, where detachment is approached at high fueling rates.

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