Reduced model (SOLT) simulations of neutral-plasma interaction[1] DAVID RUSSELL, JAMES MYRA, Lodestar Res Corp — The 2D scrape-off-layer turbulence (SOLT) code has been enhanced by the addition of kinetic-neutral physics. Plasma-neutral interactions include charge exchange (CX) and ionization (IZ). Under the assumption that the CX and IZ collision rates are independent of the ion-neutral relative velocity, a 1D (radial: x) Boltzmann equation has been derived [1] for the evolution of the (v_y,v_z)-averaged neutral distribution function (G), and that evolution has been added to SOLT. The CX and IZ rates are determined by the poloidally (y) averaged plasma density and temperatures, and $G = G(x,v_x,t)$. Results from 1D simulations that use diffusion as a proxy for turbulent transport are presented to illustrate the capability, including the approach to a steady state driven by sustained neutral injection in the far-SOL and source-driven heating in the core. Neutral density and energy profiles are obtained for the resulting *self-consistent equilibrium* plasma profiles. The effect of neutral drag on poloidal ExB mean flow and shearing rate is illustrated. Progress on 2D turbulence (blob) simulations is reported. [1] J. R. Myra and D. A. Russell, Transport Task Force Workshop, Williamsburg, Virginia, April 25-28, 2017, poster B23.

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