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Initial Results from a Coupled Kinetic Plasma - Neutral Transport Code¹ D.P. STOTLER, PPPL, C.S. CHANG, G. PARK, NYU, CPES TEAM — To provide a kinetic neutral simulation capability for the Center for Plasma Edge Simulation, a subroutine interface to the DEGAS 2 Monte Carlo neutral transport code has been implemented and coupled into the XGC neoclassical particle transport code. The neutral transport routine simulates the collision of kinetic neutrals with a fluid plasma background provided by XGC; a complementary collision routine in XGC handles plasma particle collisions with a fluid neutral background. While mass conservation between the plasma and neutral species is ensured, the rates at which momentum and energy are exchanged will not be the same in the two calculations to the degree that the kinetic distributions are non-Maxwellian. We assess non-conservation of the instantaneous and time integrated momentum and energy exchanges in a physically relevant simulation. We will also compare the resulting neutral penetration and pedestal buildup obtained with that computed by the rudimentary Monte Carlo neutral transport routine used in the original XGC code. Extensions, such as the inclusion of molecules and time dependence, will be discussed.

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