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Study of neoclassical transport in resonant magnetic perturbation edge localized mode suppressed plasmas in DIII-D PRIYANJANA SINHA, Princeton Plasma Physics Laboratory, NATE FERRARO, Princeton Plasma Physics Laboratory, Princeton, NJ, EMILY BELLI, General Atomics, San Diego, CA , PRINCETON PLASMA PHYSICS LABORATORY TEAM, DIII-D COLLABORATION — Resonant magnetic perturbations (RMPs) are applied to mitigate or suppress the edge localized modes (ELMs) in H-mode plasmas, leading to a decrease in the plasma density, which is often referred to as density pump-out. It is essential to understand the role of neoclassical transport in density pump-out. In this study, drift kinetic code NEO with the enhanced capability to handle non-axisymmetric flux geometry is used to evaluate the neoclassical transport properties in DIII-D plasmas. The magnetic field given as an input to the NEO code is calculated using extended magnetohydrodynamic code M3D-C1 and includes the linear two-fluid plasma response. The study performed here indicates an increase in neoclassical particle and energy fluxes during the ELM suppressed phase in DIII-D plasmas, which correlates with the density pump-out phenomenon and is on the same order to experimentally observed flux values. Additionally, investigation on the effect of neoclassical torque viscosity (NTV) on density pump-out and its possible role in the braking of rotation profile due to RMP application, has been carried out. A sensitivity study to examine the impact of the different values of RMP on NTV gives a qualitative agreement to the theory that predicts a rise in NTV with the increase in RMP.

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