Abstract Submitted
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Comparison of measured and modeled gas-puff emissions on Alcator C-Mod[1] SEUNG-GYOU BAEK, J. L. TERRY, MIT PSFC, D. P. STOTLER, PPPL, B. L. LABOMBARD, D. F. BRUNNER, MIT PSFC — Understanding neutral transport in tokamak boundary plasmas is important because of its possible effects on the pedestal and scrape-off layer (SOL). On Alcator C-Mod, measured neutral line emissions from externally-puffed deuterium and helium gases are compared with the synthetic results of a neutral transport code, DEGAS 2. The injected gas flow rate and the camera response are absolutely calibrated. Time-averaged SOL density and temperature profiles are input to a steady-state simulation. An updated helium atomic model is employed in DEGAS2. Good agreement is found for the Dα peak brightness and profile shape. However, the measured helium I line brightness is found to be lower than that in the simulation results by a roughly a factor of three over a wide range of density particularly in the far SOL region. Two possible causes for this discrepancy are reviewed. First, local cooling due to gas puff may suppress the line emission. Second, time-dependent turbulence effect may impact the helium neutral transport. Unlike deuterium atoms that gain energy from charge exchange and dissociation processes, helium neutrals remain cold and have a relatively short mean free path, known to make them prone to turbulence based on the Kubo number criterion.

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