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Experiments to test for MAR in detaching plasmas in the PISCES-A divertor simulator¹ LAIZHONG CAI, GEORGE TYNAN, ERIC HOLLMANN, DAISUKE NISHIJIMA, Department of Mechanical and Aerospace Engineering, University of California San Diego, La Jolla, CA 92093-0417 — Normally, Electron-Ion Recombination (EIR) is considered the dominant volume recombination process in detaching divertors. More recently, Molecular-Activated Recombination (MAR) was suggested as a possible volume recombination channel [Pigarov, Phys. Scripta]. Indirect experimental evidence for MAR has been seen in previous experiments [NAGDIS PRL]. We describe experiments which attempt to more conclusively establish the presence of MAR in detaching divertors. The EIR rate is obtained in PISCES-A He plasmas by absolutely calibrating high n He-I line emission associated with EIR in the cool (<1 eV) halo region of the plasma column. A small amount of H₂ gas is injected into this plasma, resulting in a collapse of EIR emission in the halo region. Concurrent with this collapse, an increase in the H α /H γ ratio is observed in the halo region and suggests the presence of MAR, which produces H neutrals in low excited states in contrast to EIR. Additionally, preliminary particle conservation measurements used to estimate the magnitude of the recombination sink in the plasma edge will be presented.

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