Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Experiments for measuring EIR and MAR in detaching plasmas in the PISCES-A divertor simulator LAIZHONG CAI, GEORGE TYNAN, ERIC HOLLMANN, DAISUKE NISHIJIMA, University of California, San Diego — Traditionally, Electron-Ion Recombination (EIR) is considered the dominant volume recombination process in detaching divertors. However, Molecular-Activated Recombination (MAR) was found both in PISCES-A and NAGDIS-II, which could be an important path to make a detaching plasma. The EIR sink rate is obtained in a pure magnetized He plasma column by absolutely calibrated high n (principle quantum number) He-I line emission associated with EIR. A small amount of H_2 gas is then injected into this plasma, resulting in the collapse of EIR emission with sufficient H_2 gas density. Since MAR produces H neutrals in a low excited or ground states in contrast to EIR associated with highly excited states, it will not bother the measurements of EIR. Using an integral form of the particle conservation equation, the MAR sink rate is derived with the measured parallel flux, ionization source, EIR sink and anomalous radial flux to the wall. Finally, the EIR and MAR are demonstrated quantitatively. The role of MAR is shown against the percentage of H_2 gas.

Laizhong Cai
University of California, San Diego

Date submitted: 24 Jul 2007 Electronic form version 1.4