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Characterization of the L-H Power Threshold on NSTX D.J. BATTAGLIA, R. MAINGI, ORNL, S.M. KAYE, J.C. HOSEA, B.P. LEBLANC, R. MAQUEDA, S. SABBAGH, G. TAYLOR, J.R. WILSON, S. ZWEBEN, PPPL, C.S. CHANG, G.-Y. PARK, NYU, NSTX TEAM — The L-H power threshold in NSTX is 20 - 40% larger for helium plasmas than comparable deuterium plasmas. This result was obtained using modest plasma current (0.6 MA) discharges where the auxiliary plasma heating and current drive was provided by HHFW (30 MHz) RF with 90 degree strap-to-strap phasing ($k_{||} = 8$ m^{-1}). This experiment will be repeated on NSTX using higher plasma current (0.8 MA) discharges that are heated using HHFW with 180 degree phasing ($k_{||} = 14$ m^{-1}) in order to reduce the uncertainties associated with calculating the heating power and to utilize the GPI diagnostic to characterize the SOL turbulence around the time of the L-H transition. Another planned experiment will build on the observation that the L-H power threshold decreases as the lower x-point radius is increased on NSTX. This result is consistent with XGC calculations that predict an enhancement in the radial electric field due to increased ion-orbit losses. This research is supported by the US DOE Fusion Energy Postdoctoral Research Program administered by ORISE under contract number DE-AC05-06OR23100 and by the US DOE contracts DE-AC02-09CH11466 and DE-AC05-00OR22725.

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