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Beta Scaling and Momentum Transport Studies in NSTX STANLEY KAYE, W. SOLOMON, R.E. BELL, B.P. LEBLANC, Princeton Plasma Physics Laboratory, F.M. LEVINTON, NOVA Photonics, J.E. MENARD, Princeton Plasma Physics Laboratory, S.A. SABBAGH, Columbia University, H. YUH, NOVA Photonics — Experiments have been carried out in NSTX to study both the beta scaling of confinement and momentum transport. Beta scaling studies were carried out at fixed collisionality and normalized electron gyroradius both in highly shaped plasmas (κ=2.1, δ=0.8) and in weakly-shaped plasmas (κ=1.8-1.9, δ=0.4). In the highly shaped plasmas, which exhibited small ELMS in the range of beta from 7 to 20%, no degradation of energy confinement was observed. In the more weakly shaped plasmas, the character and impact of ELMs changed markedly from low to high beta, leading to a severe degradation of confinement as beta increased. Momentum diffusivity in NSTX does not scale with ion thermal diffusivity, as at conventional aspect ratio, possibly due to suppression of ITG modes due to high ExB shear. Perturbative momentum transport studies, using non-resonant n=3 magnetic braking of the plasma, have been carried out, and these indicate momentum confinement times that are a factor of two to three greater than the energy confinement time, as well as significant inward momentum pinch velocities. This work is supported by United States DOE contract DE-AC02-76CH03073.

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