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**Distribution Function Effects on the Stability of Plasmas in the Paul Trap Simulator Experiment**[1] E.P. GILSON, M. CHUNG, R.C. DAVIDSON, M. DORF, P.C. EFTHIMION, R. MAJESKI, E.A. STARTSEV, H. WANG, Princeton Plasma Physics Laboratory, N. THOMAS, Massachusetts Institute of Technology, A. ARORA, Cornell University — Initial results are reported from experiments to study the effects of modified distribution functions on the stability of plasmas trapped in the Paul Trap Simulator Experiment (PTSX). The PTSX system is a compact laboratory Paul trap that simulates a long, thin charged-particle bunch coasting through a kilometers-long magnetic alternating-gradient transport system by putting the physicist in the frame-of-reference of the beam. The transverse dynamics of particles in both systems are described by the same sets of equations - including all nonlinear space-charge effects. By masking the PTSX ion source, various transverse plasma density profiles can be injected into the machine such as: a hollow profile, an off- axis profile, and an array of small beamlets. The shape of the long-time transverse plasma density profile is a measured and used to determine the effect of the initial modified distribution on the stability of the plasma. The results are compared to WARP particle-in-cell simulations.

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