Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Nonlinear and noise effects in development of Buneman instability[1] A. TAVASSOLI, Univ of Saskatchewan, S. JANHUNEN, Univ Texas-Austin, O. CHAPURIN, M. JIMENEZ JIMENEZ, T. ZINTEL, M. PAPAHN ZADEH, M. SHOUCRI, R. SPITERI, L. COUEDEL, A. SMOLYAKOV, Univ of Saskatchewan — We report on studies of the Buneman type instability driven by the relative drift of warm electrons with respect to warm ions. A series of highly resolved PIC and Vlasov simulations are performed and compared. Linear simulations show that although the results of PIC simulations from several different codes agree, they are different from Vlasov simulations when the beam electron velocity is relatively low. The difference between the PIC and Vlasov results is explained by the electron trapping in initial noisy distributions of the electric potential. In the deeply nonlinear stage, we observe strong modification of the electron distribution function and generation of backward waves (in the direction opposite to the velocity of the electron beam). The backward waves are the result of the wave-particle and resonant mode excitation by the electron beams from the modified electron distribution function. The formation and evolution of the electron and ions holes are further investigated.

[1]The work supported in part by NSERC Canada, Compute Canada US AFOSR.

Andrei Smolyakov
Univ of Saskatchewan

Date submitted: 02 Jul 2020 Electronic form version 1.4