Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

A three-dimensional particle-in-cell simulation of the diocotron instability for cylindrical geometry YOUNG HYUN JO, VLADIMIR V. MIKHAILENKO, VLADIMIR S. MIKHAILENKO, HAE JUNE LEE, Pusan National University — In a non-neutral plasma like an electron beam under a magnetic field, the diocotron instability can occur with a shear in the flow velocity of surface waves, which is a type of Kelvin-Helmholtz instability in principle. Recently, there has been advanced theories that explain the evolution of the diocotron instability using non-modal analysis considering shearing modes. In a previous study, a two-dimensional particle-in-cell simulation was performed for verification of the theory with an initially loaded cylindrical annular plasma column surrounded by a conducting boundary. The growth rates of the diocotron instability measured in the simulation agree well with the theory. As an extension of the previous work, we have extended the model to a three-dimensional cylindrical particle-in-cell simulation and compared the results with those of the two-dimensional simulation. In addition, the effect of the particle flows in the axial direction has been investigated.

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Date submitted: 16 Jul 2017 Electronic form version 1.4