# EXPERIMENTAL ANALYSIS OF PLASMA BASED MINIATURIZED SHEET ELECTRON BEAM SOURCE

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There exists an opportunity for the development of electron device based high power sources of THz radiation that rely on the common physical principle of converting the kinetic energy of an electron beam into electromagnetic field energy [1]. The most complex and significant ones in THz band require a miniaturized cylindrical three-dimensional structure, vacuum-tight enclosure and a typical requirement for magnetic field to confine or control the electron beam. The miniaturized structure reduces the power handling capabilities of the source and also limits the cylindrical beam propagation inside it due to space charge effect [2]. The sheet-electron beam has advantages over cylindrical-electron beam in terms of reduced space charge field [3]. However, in-depth research is required to understand the challenges involved in the propagation of the sheet-electron-beam in such miniaturized structure. The issue can be addressed by the presence of plasma inside such structure during the propagation of the sheet-electron beam. Experimental analysis has been carried out for beam current analysis in the drift space for different applied gap voltages between 10 kV-20 kV in self-breakdown mode. The electron beam has been propagated for more than 50 mm inside the drift space without assistance of external magnetic field.

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