

Abstract Submitted
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Review of Methods for Neutralization of Intense High-Energy Ion Beam Pulses by Electrons¹ IGOR D. KAGANOVICH, WILL BERDANIER, RONALD C. DAVIDSON, EDWARD A. STARTSEV, Princeton Plasma Physics Laboratory — For ballistic propagation of intense ion beam pulses, the beam charge and current have to be neutralized, so that the self-electric and self-magnetic fields do not affect the ballistic propagation of the beam. In this paper we review several neutralization schemes for intense ion beam pulses, including neutralization by emitting filaments positioned near the beam sides, neutralization by gas ionization, neutralization by a grid immersed in the beam path, and neutralization by passing the beam pulse through a background plasma, either a finitesize layer of plasma or a volumetric plasma produced everywhere along the beam path [1]. The most efficient scheme is neutralization by dense volumetric plasma. However, if dense plasma is not available a combination of tenuous plasma and filament emitters may be sufficient. Filaments provide extra electrons to neutralize the ion beam space charge and tenuous plasma short-circuit the electric field.

[1] I. D. Kaganovich, *et al.*, *Physics of Plasmas* **17**, 056703 (2010).

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