Abstract Submitted
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EMF generation in low-temperature plasma[1] ALEXANDER PAL, VALERY BABICHEV, NIKOLAY DYATKO, ANATOLY FILIPPOV, ANDREY STAROSTIN, SRC RF Troitsk Institute for Innovation and Fusion Research, 142190 Troitsk, Moscow, Russia — EMF generation in plasma created by an e-beam in electropositive gases at atmospheric pressure was investigated experimentally and numerically. It was found that propagation of 120 keV e-beam with cross-section 1.2×2 cm2 and current of 240 μA through argon at 10^5 Pa gas pressure between an aluminum exit window and an iron collector was followed by 360 μA current of opposite direction. A numerical modeling of the current flux was performed in an one-dimensional approximation along the axis z in the direction of e-beam propagation. It is seen, that the current density grows with increasing the ionization rate and the largest effect takes place in argon. The discovered effect of the current flux is determined by nonuniform gas ionization resulting in different diffusion electron fluxes near different electrodes and, therefore, in different near-electrodes potential falls. This difference creates a steady current flux in the inter-electrode gap. The mechanism of EMF generation is analogous to the Dember effect at the nonuniform photoexcitation of semiconductors.

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