The specific current action integral for high-frequency current exploded conductors

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The explosive emission processes that occur at electrode surface microprotrusions may have harmful effects in a variety of electrodynamic and acceleration systems exposed to high-power radiofrequency electromagnetic waves. This paper presents the results of a radiative magnetohydrodynamic simulation of the explosion of copper conductors that occurs under conditions inherent in the explosion of electrode microprotrusions. Explosions occurring under quasi-stationary and radiofrequency conditions were considered. It was shown that in all the considered cases, the explosion occurred at high temperatures, so that the energy deposited in the conductor by the time of explosion exceeded the sublimation energy of the conductor material. It turned out, however, that the energy deposited in the conductor under radiofrequency conditions, regardless of the frequency of current oscillations, was more than two times less than that deposited under quasi-stationary conditions. For a radiofrequency explosion, the specific current action integral was somewhat less than that for a quasi-stationary explosion, and its value was actually independent of frequency.
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