Numerical simulation of the shock wave propagation in the discharge chamber with megaampere discharge in high density gas

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Numerical simulation of the shock wave propagation in the discharge chamber with the high-current discharge in high density hydrogen (0.1–32 MPa) under the condition of non-stationary energy release (initial current rise of rate 10^{10} A/s), was carried out by the finite-differences method [1]. The source of the disturbance (shock wave) is a discharge channel in the interelectrode gap, located along the axis of the cylindrical chamber [2]. The power disturbance of the source, in the first approximation, is given by the experimental power value in near-axis area.

The numerical and experimental results on the wall and the axis of the channel have been compared. A series of pressure waves is observed with gas heating of in the discharge chamber. A qualitative match has been achieved [2, 3]. The time dependencies of temperature and the spatiotemporal distribution of pressure, density and etc in the discharge chamber are presented.

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