

Experimental study of a shock wave movement in a pulse gas discharge plasma

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In this work, the movement of a plane shock wave in the plasma region of a nanosecond volume discharge was experimentally investigated. The Mach numbers of shock waves were 2.2—3.2. The dynamics of the shock wave in the plasma volume was studied, the data obtained were compared with the plasma processes.

The experiments were carried out in a shock tube with a discharge chamber, in which a combined volume discharge with a duration of ~ 500 ns was initiated at a pulse voltage of 25 kV [1,2]. The plasma volume was $100 \times 30 \times 24$ mm³. Based on high-speed shadowgraphy, the analysis of the shock wave movement was carried out.

It is established that the shock wave dynamics depends on the recombination and relaxation processes in the plasma. Temporal variation of plasma near the shock-wave front is related also to shock compression of a relaxing plasma region [2]. The results obtained can be used to shock wave control using pulsed discharges.

[1] I Znamenskaya I Mursenkova I D I I 2019 *Physics of Fluids* **31**

[2] A Kuznetsov I M 2016 *Prikl. Fiz* **5** 16–21