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SIMULATION OF THIN FILM ACCELERATIN INTO CYLINDRICAL CHANNEL *)

Lebo I.G., Nikolaev M.

MIREA – Russian Technological University, Moscow, Russia, lebo@mirea.ru, misha.nikoll@yandex.ru

Using the NUTCY program [1], two-dimensional equations of gas dynamics are numerically solved in Eulerian cylindrical coordinates (r, z, t, t - time). In the calculations, the Mach number (Mx=10) was set, and the parameters behind the SW front were calculated using the Hugoniot ratios.

The results of calculations of two tasks are presented: the expansion of power shock wave (SW) into cylindrical channel, filled Air with initial pressure 1 Bar (1); the modelling of thin polymer film acceleration by strong shock wave with Mx=10 is made (2). The channel was filled Air with initial pressure 1 Bar. The radius of channel was R_c=0.1 cm, and radius of calculation region was R_0=0.25 cm. The shock wave moves from top to down with Mx = 10 (blue region at t = 0). The initial density of film is 1 g/cm^3, and thickness is 50 μm.

The results of the first task have been compared with the data of [2], where SW moved in Ar gas.

The results of the second task illustrate Fig.1.

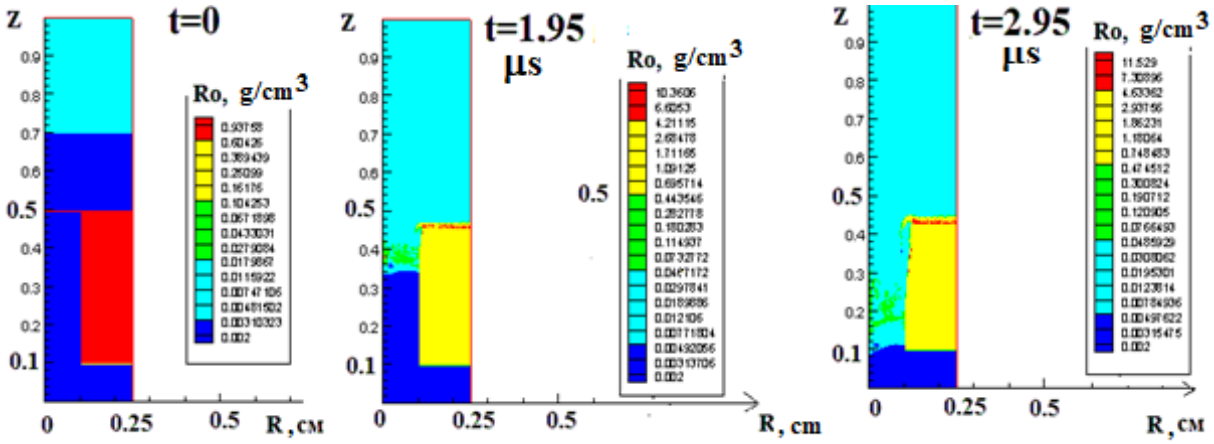

Fig. 1. Gas density distribution fields at time points a) t = 0 μs, b) t = 1.95 μs, c) t = 2.95 μs

SW moves from top to bottom (blue flower), thin film is destroyed and fragmented. The high density layer is flying with average speed 1.36 км/s.

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References

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*) abstracts of this report in Russian