STUDY OF CONDITIONS REQUIRED FOR HYDRODYNAMIC STABILITY OF COMPRESSION OF A RADIATING Z-PINCH AT CURRENT IMPLOSION OF 2-CASCADE NESTED ARRAY AND SINGLE ARRAY OF METALLIC DIELECTRIC FIBERS [[1]](#footnote-1)\*)

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Emitting Z-pinches created by current plasma compression under the action of a high-voltage pulse of a mega-ampere current of electrophysical facilities [1, 2] are used as powerful pulsed sources of soft X-ray radiation (SXR). In the case of current implosion of nested arrays, when the outer array is a cylindrical array of plastic fibers, and the inner one is a conventional array of tungsten wires, it was first discovered at the Angara-5-1 facility [3] that such conditions can be realized under which the compression of the tungsten plasma inner array is stable. In this case, the development of the magnetic Rayleigh-Taylor (MRI) instability, which is characteristic of the compression of the plasma of single cylindrical wire arrays, is strongly suppressed. As a result, a stable and compact Z-pinch is formed on the axis of the nested arrays. Simulation and experimental study of the processes of interaction of plasma flows and magnetic field in the interstage space of nested arrays are given in [3]. Comparison of the results of simulation and experimental study of the implosion of nested arrays showed that when the high-speed plasma flow of the outer array collides with the magnetic field of the discharge current flowing through the plasma of the inner array, a shock wave (SW) region is formed between arrays.

The report will be devoted to the theoretical and experimental study of current implosion of nested and single arrays of metallized dielectric fibers to search for physical conditions that determine the control of the time profile and amplitude of the SXR pulse. To simulate plasma implosion, the RMHD code MARPLE\_3D [4] is used, the data on the equations of state and optical properties of matter were calculated using the THERMOS program [5] developed at the Keldysh Institute of Applied Mathematics, RAS. To describe the evaporation of wires under the action of a current, a semi-empirical model is used [6], taking into account the experimental data on the rate of plasma formation [7]. This makes it possible to adequately take into account the process of extended plasma formation of fibers and wires of the nested array.

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