duced particle lifetimes equal to approximately 30 Bohm times and an energy lifetime equal to four Bohm times in a dense hot plasma. These results break all records. At the present time, no other experimental or theoretical data capable of compromising the stellarator program have been observed. However, owing to the complicated construction of the stellarators, the development of the program proceeds slowly, mainly via small model installations.

The main tasks of the stellarator program in the nearest future is as follows:

1) Investigations of containment of a plasma with density 10^{12}–10^{13} cm at a temperature $T_e \sim 1$ keV and at transverse plasma dimensions 20 cm. To this end, apparently, special installations will be constructed in the near future (USSR, West Germany, England).

2) Investigation of the role of the convective cells in plasma loss and development of methods of combatting them.

3) Development of new methods of injection and heating of plasma, including high-frequency and laser methods. Elucidation of the role of injection in the appearance of convective cells and anomalous plasma drift.

4) Search and selection of optimal systems, which apparently will occupy an intermediate position between installations with double-helix and triple-helix windings, stellarators, and torsotrons.

5) The use of various high-frequency systems of stabilizing the instability in stellarators, including feedback systems.

6) Continuation of the development of technical problems of effective utilization of magnetic fields, the use of cryogenic windings, and placement of windings in the vacuum chamber. The development of hypothetical reactors based on stellarators.

O. N. Krokhin. Use of Lasers for Plasma Heating

High-power pulsed laser make it possible to obtain high rates of energy release in a dense plasma, and can therefore be used for effective heating of plasma to thermonuclear temperatures. The most unpleasant factor when attempts are made to use lasers for thermonuclear fusion is the low efficiency of laser devices, on the order of 0.2–0.3%. This circumstance makes it practically impossible to obtain a positive yield by direct heating of a certain plasma region with a light pulse (unless, of course, the laser efficiency is increased in the future). The only method of obtaining energy gain is therefore, apparently, to use the regime of "thermonuclear burning" of the medium, in which the laser serves to produce suitable initial conditions. In other words, this means that since the optical energy is expensive, it is necessary to study, during the first stage, the possibility of obtaining sufficiently large energy gains in a plasma heated by laser radiation.

Calculations show that at least two procedures are promising: the use of the regime of inertial "self-containment" and cumulative effects. In the former case the criterion $nt = 10^{14}$ can be satisfied at a plasma temperature 8–10 keV, which is attained at a laser-pulse energy $\sim 10^5$ J/mm^2 on the surface of solid deuterium–tritium, and at a pulse duration 10^{-9} sec. This regime can apparently not result in an appreciable energy gain, but can probably be improved using a special experimental geometry that allows the plasma to be kept from expanding during a much longer time than the "self-containment" time.

The main results were published in Vestnik AN SSSR No. 6, 1970 (article "Use of Lasers for Thermonuclear Fusion") by N. G. Basov and O. N. Krokhin).

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