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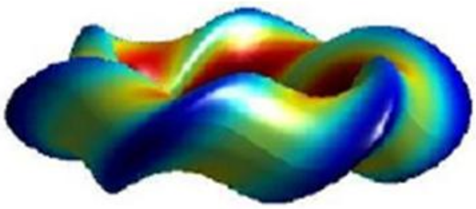

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22. Dolgoleva G.V. (*Keldysh Institute of Applied Mathematics of the RAS, Moscow, Russia*)
    Analytical and numerical design of three-stage cylindrical targets.

23. Maiorov S.A., [1]Bastykova N.Kh., [1]Kodanova S.K., [1]Ramazanov T.S. (*A.M. Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow, Russia, [1]Al-Farabi Kazakh National University, Almaty, Kazakhstan*)
    Hydrodynamic model of d-t target compression by laser radiation and heavy ion beam.

24. Maiorov S.A., Golyatina R.I., [1]Kodanova S.K., [1]Ramazanov T.S., [2]Kaikanov M. (*A.M. Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow, Russia, [1]Al-Farabi Kazakh National University, Almaty, Kazakhstan, [2]National Laboratory Astana, Nazarbayev University, Astana, Kazakhstan*)
    Calculation of energy relaxation in plasmas of positronium, protium, deuterium and tritium by the method of molecular dynamics.

25. Golyatina R.I., [1]Kodanova S.K., [1]Ramazanov T.S., Maiorov S.A. (*A.M. Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow, Russia, [1]Al-Farabi Kazakh National University, Almaty, Kazakhstan*)
    Visualization of ion trajectories in a dense plasma calculated by Monte Carlo method.

HYDRODYNAMIC MODEL OF D-T TARGET COMPRESSION BY LASER RADIATION AND HEAVY ION BEAM

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In this work using the method of molecular dynamics simulated the temperature equalization for fully ionized, hot, ideal plasma. Considered the following physical systems:

1) fully ionized plasma of hydrogen isotopes: protium, deuterium and tritium, i.e., system consisting of particles with the same highest charge but different masses (electrons and ions);

2) positronium plasma, i.e., system with equal masses and charges.

The problem of the relaxation temperature is considered by many authors, beginning with the first kinetic models [1], as well as the methods of computational experiment [2–4]. Usually, theoretical models are limited to the case of small system deviations from the equilibrium state. Calculation of the energy relaxation between the two sub-systems far from equilibrium, really is possible only on the basis of numerical simulation.

We consider a volume in which the initial time contains two components with different temperatures: electrons and singly charged positive particles (positrons, protons, nuclei of deuterium and tritium). For high-temperature plasma in inertial confinement fusion as a good model of the interaction potential is the Coulomb potential. The system should be supplemented by boundary conditions. For this task are possible different boundary conditions, most commonly, used the periodic or specular boundary condition.

The temperatures are equalized at the relaxation time of the initial state. The plasma can be trapped, or scatter in vacuum - anyway, interaction of electron and ion subsystems tends to equalize the temperatures. If it is the electrons and positrons, we can speak of a fully ionized plasma positronium.

The result of the calculations is the kinetic energy of the electron and ion subsystems, as a function of time. The slope of the curves can be determined Coulomb logarithm. Processing the results of calculations provides an estimate for the Coulomb logarithm, and to compare existing models. Particularly, by definition from a computational experiment Coulomb logarithm can be defined upper limit of integration in the procedure Coulomb collisions, the lower limit of integration in the Coulomb logarithm accurately calculated analytically.

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