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P5.2001 Energy deposition and ion stopping in inertial confinement fusion plasmas

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Investigation of interaction processes of ion beams with dense plasmas is one of the key problems in physics of inertial confinement fusion driven by heavy ion beams [1]. The stopping power is an important quantity used to describe the interaction of particle beams with matter. In the field of particle-driven inertial confinement fusion, interaction of highly charged ions with dense plasmas is of special interest [2-3]. Consequently, knowledge of dynamical characteristics of plasma ions in the ICF, such as the implosion time, energy deposition, penetration depth and the effective range in the plasma will enable us to calculate the design of thermonuclear target more accurately. In this work, the Monte Carlo method is used for simulation of ion trajectories in a dense plasma of inertial confinement fusion [4]. The main advantage of calculations by the Monte Carlo method is that they allows us to take into account any physical process directly, for example, local and non-local inelastic energy losses, binding energy between atoms, charge transfer collisions, etc. Moreover, it is possible to obtain accurate solutions for multi-target and multi-layered complex geometry, which allows us to simulate actual interactions with the plasma ion beam. The values of energy deposition, energy partition, and implosion time in a wide range of densities and temperatures for inertial confinement fusion applications have been calculated. The obtained results for energy loss of particles and other energetic characteristics in dense plasma are compared with the available experimental data and theoretical results of other authors [5].
1. R. Davidson (Ed.) Frontiers of High Energy Density Physics, Washington; D.C.: Natl. Acad. Press, (2003). 2. D.H.H.Hoffmann, K. Weyrich, H. Wahl et al, Phys. Rev. A 42, 2313 (1990) 3. D.O. Gericke and M. Schlanges, Phys.Rev. E 60, 904 (1999) 4. S.K. Kodanova, T. S. Ramazanov, M. K. Issanova, N.K. Bastykova, R.I. Golyatina, S.A. Maiorov, J. Phys.: Conf. Ser. 946, 012014 (2018) 5. L.S. Brown, D.L Preston, and R.L. Singleton Jr., Phys. Rev. E 86, 016406 (2012)

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