BALL LIGHTNING AS A SOURCE OF MUONS FOR MUON-CATALYTIC SYNTHESIS

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The most perspective approach to nuclear fusion is the concept of muon catalytic synthesis. Due to the muon catalysis in the solar corona, the synthesis reaction occurs at a temperature that is 100 times less than is required to overcome Coulomb repulsion. As follows from the theory, the reaction can occur at very low temperatures. The main problem of muon-catalyzed nuclear fusion lies in the fact that existing sources require considerable energy expenses for the production of muons. A cheap source of muons is ball lightning, which interacts with a target or a dense low-temperature deuterium-tritium mixture. Earlier in experiments, the phenomenon of anomalous passage of ball lightning through solid-state absorbers was discovered [1]. This phenomenon can be explained only by the multistage generation of particles at the interaction of high-energy protons of the external shell of ball lightning with a dense medium [2]. A similar phenomenon is realized in extensive air showers, discovered by Pierre Auger. The existence of muons and neutrino in the interaction of ball lightning with a thick metal absorber is confirmed by the presence of a ball lightning passed through the absorber. In the experiments were used plumbum absorbers 6 cm thick.

In the ordinary state, the energy that protons of ball lightning recruit in alternating fields is 20-25 MeV. Ball lightning has its own poloidal magnetic field. When ball lightning enters a dense medium with finite dielectric permittivity, the induction of its magnetic field changes. In alternating magnetic fields, the acceleration of charged particles occurs. The generation or disappearance of a magnetic field is accompanied by the appearance of an induced electric field in which electrons and protons can be accelerated to relativistic energies, i.e. the effect of conversion of the magnetic field energy to the kinetic energy of the charged particles takes place. At the entrance of ball lightning into a dense medium, due to the conversion effect, protons gain energy of 140 MeV, which is required for the generation of pions. The decay of pions, as is well known, leads to generation of muons, neutrinos, and antineutrinos. Great interest present the cycle associated with usage of negative muons. As is known, the same negative muon can participate in 120-150 synthesis events. In a short time it is possible to create a compact nuclear fusion reactor. The cost of creating a demonstration version of the reactor based on muon catalysis is one hundred million times less than the cost of the ITER tokamak. Ball lightning as a structural and physical analogue of the radiating star [1] is the key to solving the problem of obtaining pure energy based on the muon catalytic synthesis [3].

References.

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