Ball lightning as a key for the solution of an energy problem by means of muon-catalyzed fusion

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The main aim of the work is to develop a method for solving the problem of energy by using muons that are obtained by reacting of a ball lightning with a dense medium. On basis of experiments on the interaction of a ball lightning with a dense medium it was shown that in this case there is a generation of muons and muon neutrino, i.e. cascade process is realized, which is similar to the process in extensive air showers. The usage of ball lightning as a source of muons for muon-catalyzed fusion in reactors will improve conditions of operation and allow carrying out the nuclear fusion reaction at a lower temperature without insoluble problems which are characteristic of traditional methods of fusion.

As is known traditional methods of receiving of nuclear fusion reactions have a number of insoluble problems [1]. One of the main problems that have no solutions in the reactors with magnetic confinement is anomalous plasma transport on chamber walls. Anomalous transport of plasma is caused by an instability due to the charge separation and the formation of electrical domains – so-called domain instability [2]. Domain instability is a characteristic state of plasma in the presence of strong fields and high temperature. There is no methods in Nature for suppressing this instability. Therefore it is necessary to look for more simple and more efficient methods for successful solving the problem of nuclear fusion.

The analysis shows that the energy problem can be solved on the basis of the muon-catalyzed fusion. The concept of muonic catalytic fusion is one of most promising approaches to nuclear fusion. The only obstacle for muon-catalyzed fusion realization is the high cost of muons in existing devices for their obtaining. Existing giant sources of muons require considerable quantity of energy to produce muons. In the experiments it was established that the ball lightning has extremely high penetrating ability, i.e. phenomena of superpassability [3]. This phenomenon may be explained by multistage generation of particles due to interaction of high-energy protons of external shell of the ball lightning with dense medium [4]. An interaction of protons with atoms or molecules of dense medium causes appearance of neutral and charged pions. The decay of the pions is accompanied by appearance of either negative muons and muon antineutrinos or positive muons and muon neutrinos. The generation of muons at interaction of the ball lightning with dense medium makes it possible to use of them for nuclear fusion purposes. Only the cycle associated with the usage of negative muons represents the interest.

The analysis shows that the cheapest source of muons can be a ball lightning that interacts with the dense low temperature deuterium-tritium plasma. An electric power of facility to produce the ball lightnings "Prometheus" including system of control is equal to 5.4 kW, and its square is 6 m^2. An interesting application is a periodic injection of ball lightnings into the chamber of the reactor of nuclear fu-sion which was preliminary filled of plasma. The proposed method of nuclear fusion has a number of significant advantages compared to the existing methods. The method is based on real data obtained by the authors in the experiments on generation of ball lightnings. The suggested method of solution of the fusion problem requires an experimental validation. The cost of creating the demo version of nuclear fusion reactor based on muon catalysis is symbolic. A physical model of the reactor was created. Experiments were performed in water steam.

May be we should understand the expression P.L.Kapitza "Ball lightning is a small window in the great unknown world" as a hint to the effect that the ball lightning is a unique key to the solution of the problem of obtaining clean energy.

References

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