1-17

MAGNETIC CONFINEMENT SYSTEMS - ADVANTAGES OF COMPACT PLASMA AND TOROID

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Magnetic fusion community is close to the first reactor ever made. So, the next step will be made is to simplify the technology and reducing the cost of electricity. It seems so far from right now, but many other concepts are still waiting their time and more detail analysis [1].

Fortunately, in magnetic geometries like the field reversed configuration and spheromak, where a compact toroid is immersed in a linear external magnetic-field geometry, almost all of the charged particle transport losses will flow out the ends of the device. So, transport from the plasma edge may be reduced by applying arbitrary system that can change magnetic field shear (perturbing magnetic field is about 1-3% of main magnetic field) [2]. It is very important for tokamak and may be tested on the compact toroids.

Last results in compact toroids research are presented with emphasizing on the open systems, which represent the big area including commercial reactor, space propulsion, medical isotopes, magnetized target fusion rocket and a passively proliferation-proof fusion power plant [3]. Fusion burn equations for D-T, D-D, and D-^{3}He thermonuclear fusion reactions are solved. Progress to date has been good with a framework set up to examine plasma physics aspects of compact toroid cases and shows that improvements in the physics must still be made.

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1-18

CONTROLLED PLASMA IN THE *DAMAVAND* TOKAMAK

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This paper addresses achievement of controlled plasma in the Damavand tokamak. Damavand tokamak has the capability to produce discharges with plasma currents up to 40 kA. The plasma position is controlled by electromagnetic forces generated by passing currents through control coils placed around the plasma. A desired control objective is maintaining the plasma in the center of vacuum vessel and to stabilize the plasma in the presence of disturbances in a time domain of the order of few milliseconds. In order to achieve maximum performance it is essential to optimize the control system. In this paper method of controlled plasma discharge are described.