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ON PHYSICAL ANALOGUES PROCESSES FOR PLASMA

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Biofuels are fed into the plasma chamber as a mist (atomized liquid-air mixture) using an ultrasonic atomizer, and air injection system. Getting to corona discharge capacitive microwave droplets instantly vaporize fuel, with partial collapse of atoms and ions.

To create the magnetic field used complex helical spiral coil with a single closed winding of two layers which are isolated from each other and from the combustion chamber by ceramic dielectric cylinder. The coil has a large inductance with a relatively small capacity and low active resistance. When flowing through the coil of an alternating electric current is observed its considerable inertia.

When released into the stable operation of the coil is able to accumulate a considerable energy of ionic electric current generated plasma flow. The main task of such a coil removed spin molecules and atoms bans on certain types of chemical reactions. At the same time it plays a role of an additional energy source for heating the plasma stream.

Plasma in our installations are:

1. The low-temperature (temperature of the order of 103-105 ° C) and the degree of ionization of 10-6-10-1 obtained by corona electrical discharges using microwave plasmatron. The voltage of the internal electrical field above the limit value, so you should peel electrons from neutral atoms and molecules.

2. The quasi-equilibrium (at pressures of atmospheric and above (normal atmospheric pressure in pascals is considered to be equal to 105 Pa = 100 kPa.). Therefore, the kinetic regularities of processes are determined only by the high temperature of the interacting particles.

3. Combined. Used simultaneously capacitive corona discharge and microwave inductive effect within the combustion chamber when an external high

frequency alternating magnetic field with a frequency of 1 - 100 MHz. The fact is that, other things being equal, the plasma, which is affected by an external magnetic field, is characterized by a significantly higher concentration of electrons compared with capacitive discharge.

The purpose of research - to evaluate the plasma particles from the viewpoint of mechanics and electrodynamics of moving charged particles, from the perspective of the application of the theory of continuum mechanics and relativistic mechanics.

Materials and methods of research. In this case, the plasma is formed from a fast capillary air-liquid stream which is subjected to the powerful influence of corona discharge generated at microwave frequencies using a plasmatron.

Droplets of liquid are rapidly cleaved molecules and atoms in accordance with the theory of thermodynamic phase transitions. Then most of the particles formed loses electrons, the ionized molecules to form atoms, which continue to move rapidly progressive in the combustion chamber. This does not make sense to take into account the probability of their collision, as the process is the nature of the stream, which is due to the recession of the design features and the influence of external fields.

Therefore, such a plasma should be considered primarily as a physical process of small mechanical motion of material bodies. And then consider the theory of combustion in a dynamically moving system. Moreover, the magnetic field should be considered as a combustion catalyst, as installation is not intended for direct production of electric current.

Obviously, none of the presented modeling approaches are not suitable for modeling of the plasma formed in the installation. At the same time, some modeling techniques may be useful.

The results of research. In the simulation of the plasma, it is often treated as a continuous medium, motion is described by a scalar field density and velocity vector field. If the density of the continuous medium constant, continuous medium is considered incompressible.

Given the fact that the electric field does not penetrate into the body of the plasma, as ionized her body is a great conductor, there remains only the impact of the magnetic field /

A system of 2 equations that describe the behavior of a continuous moving plasma environment under the influence of an external magnetic field.

Such joint description solid conductive plasma medium in the external action of the magnetic field allows you to discover the essence of magnetohydrodynamic (MHD) phenomena. It is also important to note that under the action of an external magnetic field is the removal of degeneracy polarization wave processes, so there are new branches of its own waves. Among them are:

- Alfven waves;
- magnetic sound (fast and slow magnetosonic waves);
- ordinary and extraordinary waves;
- cyclotron waves;
- fashion Bernstein;
- drift waves (in an inhomogeneous plasma).

Another important point that must be considered when creating an inductively-coupled systems. This is what is really on a charged particle in the plane of a magnetic vortex Lorentz force vector which is composed of two perpendicular vectors.

By the theorem on the circulation of the magnetic field around a conductor with current Ampere in the coil toroidal solenoid flat magnetic field vortices form complex cone-shaped wire. The flow rate in the conductor coil is the velocity of light, hence the rate of passage of vortices through the plane of the magnetic imaginary axis of the torch above, since this should be their theory of waves on the wave vector. Therefore, creating a kind of magnetic accelerator, which is to form the funnel of light charged particles (electrons), the maximum density of which falls on the plane of symmetry of the solenoidal coil in a toroidal shape. Consequently in this point there will be a maximum effect of combustion of the fuel mixture.

In fact, we have the reverse effect of what is produced as a toroidal vortex (vortex ring) which creates a jet of liquid or gas.

Torr, which is wound on the reel, a fourth order surface. In this regard, the magnetic vortex field, which forms a toroidal coil is three-dimensional. But the most surprising thing is that if the toroidal coil hollow, inside the torus is also formed a ring-shaped vortex of the magnetic field, which can also interact with positively charged ions of the plasma flow. In this case, the resonance system can be assembled, which will be not one but two toroidal coils.

The final design must be easy to choose the frequency and the distance between the toroidal coils so that both of the coils formed the resonant system and the steel work in phase in accordance with the Huygens effect.

Conclusions

Using an external magnetic field can significantly raise the effectiveness and efficiency of the boiler of the plasma, as plasma ion flux strongly reacts to the presence of an external magnetic field.