## ABSTRACT

**Relevance.** To date, humanity has been working tirelessly to improve the process of energy production, as well as to minimize pollution from the surrounding environment. There are many alternatives, but not all can meet the needs of mankind, because the population and the number of electronic devices are constantly increasing. One of the options for which is this - controlled thermonuclear fusion. The development of fusion technology can become a key factor in creating an almost inexhaustible source of energy, since fuel supplies - hydrogen - are endless. The leading experiment to achieve this idea is based on the use of a flying dipole in the center of the reactor, which holds the fused plasma with a magnetic field. However, each invention has its own problem areas and one of them - the maintenance of a dipole in a state of static levitation. To solve this, it is necessary to model the interaction of the suspension with the reactor, as well as monitor the change of the magnetic field.

**Purpose of the study –** increase the effectiveness of controlling the fusion process, namely the magnetic suspension. To achieve the goal you need to accomplish the following **tasks**:

– to carry out an overview of known results in solving the problem;

– study of stability in systems consisting of superconducting coils and permanent magnets and promising from the point of view of magnetic levitation;

– determination of the scalar potential and the field of the magnetic dipole inside the superconducting sphere, as well as finding the magnetic potential energy of the interaction of the dipole with the inner surface of the superconducting sphere and studying the stability of equilibrium in such a system;

– simulate the work of the magnetic suspension;

– simulate the interaction of the magnetic suspension with the reactor;

– determine the coefficient of efficiency and choose the parameters for the magnetic suspension;

– analyze the work of the suspension depending on its parameters;

– determine the effectiveness of the solution.

**Object of the study** - the process of magnetic suspension.

**Subject of research** - methods of maintaining a magnetic dipole in the state of static levitation.

**The scientific novelty of the obtained results**

The mathematical model of the interaction of the magnetic suspension with the use of a levitating dipole in a thermonuclear reactor has been developed and an analysis of its main parameters has been carried out in order to identify and evaluate them, which greatly influence the process of work during fusion. The use of a mathematical model allows the process of magnetic suspension to be simulated and investigate it by parameters. These results are due to the intensive study and use of LDX, especially for Dimension reduction in reactors that NASA intends to use for its spacecraft.

**Approbation of the results of the dissertation**. The main results of the dissertation work were tested at the X International Internet Conference "INNOVATION OF THE XXI CENTURY" (Kyiv, April 25, 2018); Annual scientific conference of teachers and students of NTUU "KPI im.I Sikorsky" (Kiev, April 23, 2018).

**Publications.** The main results of the dissertation research are published in 3 scientific works, among them: 2 - individual; 1 article - in the scientific journal [1]; 2 publications - conference materials [2, 3].

MAGNETIC SUSPENSION, THERMONUCLEAR FUSION, LEVITATED DIPOLE, MAGNETIC FIELD