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ON ACCELERATION OF A SUPERCONDUCTING CARRIER OF A CRYOGENIC FUEL TARGET BY A SEQUENCE OF CURRENT-CARRYING SOLENOIDS *)

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The Lebedev Physical Institute (LPI) intensively develops innovative technologies for the creation of an HTSC-MAGLEV accelerator designed to deliver a cryogenic fuel target (CFT) placed in a levitating HTSC-carrier to the ICF chamber for interaction with laser radiation [1, 2].

The LPI approach is based on the phenomenon of HTSC quantum levitation in a gradient magnetic field. Acceleration is provided by a sequence of current-carrying solenoids, and HTSC-carrier levitation – by the arrangement of solenoids along the magnetic rail.

In the work, a prototype of the elementary block for accelerating an HTSC-carrier is created and the processes of controlling its movement are studied [3]. For this purpose, a special system of operational control and tracking of the acceleration block functioning was developed and tested. The HTSC-carrier acceleration up to 1 m/s at the acceleration length La = 20 cm is demonstrated using only one pair of matched solenoids. The results obtained are of practical importance in the area of creating noncontact systems for CFT delivery due to building a linear magnetic track by connecting one elementary acceleration unit with many others to achieve the required CFT injection rates from 20 to 200 m/s and more.

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References

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*) abstracts of this report in Russian