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A Kilo-Amp Linear-Motor Type Flux Pump

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The linear-motor type high temperature superconducting (HTS) flux pump is a wireless charger which can pump DC current into the second-generation (2G) HTS tapes without the physical contact. In addition, the flux pump has the smaller volume than the traditional power supply for the same output current. So it is very convenient to charge HTS tapes by utilizing the flux pump which has a compact structure. More importantly, it avoids the serious disadvantage of heating leakage by current leads. In order to make the HTS flux pump better be used in nuclear magnetic resonance (NMR), magnetic resonance imaging (MRI), motors and other equipment that requires a strong magnetic field, we have further improved its structure so that the superconducting coil can be pumped into a larger current to generate a stronger magnetic field. In this paper, we optimized the design of the linear-motor type flux pump by reducing its AC traveling wave length and tested it. The test result shows that the total output current of the flux pump can exceed 1000A in the cryogenic environment of 77K.

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