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A miniaturized high temperature superconducting flux pump

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The flux pumping devices attract a lot of attention for the excitation of superconducting magnets or the compensation of the field decay. A carefully designed linear flux pump is presented in this work, the dimension of which is smaller than a 5 cm cube. The key part of the device is the magnetic circuit which guarantees the optimized flux pumping performance in terms of operation current, output voltage and the power efficiency. The performance of the device is tested at different driving current waveform and operation conditions of the external circuit (the superconducting magnet).
The presented flux pump is especially promising for sustaining the magnetic field of portable superconducting magnets where not only the size and weight of the power supply but also the conduction heating through the current lead is concerned.

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