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A Flexible Capacitive Pulsed Power Supply to the High Magnetic Fields for the Magnetization Measurement

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High magnetic field is an important research tool for magnetization measurement, which can help scientists to observe the physical phenomena and collect data such as Feimi surface structure and the superconductivity critical parameters. In order to meet the testing requirements of various materials, a new flexible capacitive pulsed power supply to the high magnetic fields for the magnetization measurement is designed and developed at the Wuhan National High Magnetic Field Center (WHMFC), which includes 48 capacitors (83.3 μF /25 kV), a thyristor switch (25 kV/60 kA/10 ms) with an antiparallel diode (25 kV/40 kA/10 ms), a charging unit (25 kV/2.2 A), 6 switchgears and the dump circuit. To energize different magnets and provide different pulse waveforms, the 48 capacitors are divided into three parallel modules, respectively a 8 capacitors module, a 16 capacitors module and a 24 capacitors module. These three modules can power magnets separately or in combination through three group switchgears. The power system can provide current pulses with different amplitudes and durations by adjusting charging voltage and different combinations of the three modules. The output of the power system can energize three different measurement cells through setting switchgears. In order to verify the validity of the design, the experiment is carried out. In this paper, the configuration of power supply and the system setting are introduced firstly. Then, the details of the power system are described. Finally, the experiment results are presented.

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