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## A Modular on-PCB-board high voltage capacitor bank charger

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The high pulsed magnetic field is an important scientific research tool for physics, material science, chemistry, medicine and so on. And the pulsed power supply plays an important role in generating pulsed magnetic field. Among all kinds of pulsed power supply, the capacitor bank power supply is most widely used for its simple structure and high reliability. And the resonant constant current high voltage charger is the key component of the capacitor bank power supply, it has the characteristics of high efficiency and constant current charging. However, the traditional monomer capacitor bank charger's volume is large and the cost is high.

This paper proposes a modular on-PCB capacitor bank charger to reduce the volume and the cost. Developing many identical small but full-featured LC resonant on-PCB charger, and then combining these modules through series-parallel connections to achieve voltage levels. In each module, all the components of IGBTs, diodes and step-up transformer are standard and in small size. When a module breaks down, it will be bypassed to keep the whole system properly work and can be replaced after the shot. So the present modularized charger is low cost, more compact, high reliable and easier to assemble or disassemble.

A prototype modular on-PCB charger has been successfully developed, the input voltage is AC 220 V, and the maximum output voltage is DC 2000 V, and mean charging current is 1A, and the main switches are IGBT K75T60 (75A / 600V) operated at 12.5 kHz. The serial combination experiments of three modules has been succeeded to charging a 6 kV capacitor bank. All the specific parameters and circuit schematics of one module or modules' combination will be presented as well as their experimental results.

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