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5P27 - Pulsed Power Discharge Under a Highly Capacitive Load

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This paper outlines the design and tradeoffs of a compact custom capacitive charging and discharging circuit. The system has a maximum charging voltage of 10 kV at 2 mA and utilizes an external capacitor both of which can be chosen by the user. To maintain the user's set voltage a micro-controller (MCU) in conjunction with feedback from voltage monitoring is used to make real-time voltage adjustments until the user triggers the discharge. The discharge sequence is initiated by the user via a tethered switch that isolates the user from the high voltage components and has an option to abort the discharge by bleeding the capacitor through an internal resistor. The discharge circuit is capable of handling current surges up to 5 kA and voltage spikes up to 15 kV. The design metrics are discussed, and experimental results are presented.

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