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# A SERIES INJECTION RESET CIRCUIT FOR HIGH VOLTAGE MAGNETIC SWITCH APPLICATIONS

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Magnetic switch pulse-sharpening systems rely on the hysteresis (B-H curve) properties of the material and are affected by the residual state of the previous pulse conducted through the ferromagnetic core in rep-rate applications. Prior work has used an external solenoid field (B-field) coil to reset the core material to discrete values of axial magnetic domain bias. Large pulsed current (100s to 1000 amperes) were required that complicate modulation of the injected solenoid fields. Quantifiable B-H manipulation of the magnetic switch core remanence has been demonstrated with an inductively isolated bipolar pulse modulator. User programmable adjustments are made with lower currents and the volt-second (V-s) product of the reset pulse delivered to the HV output rod that supply the main (sharpened) drive pulse to the load. Series injection of current through the pulse sharpening toroids permit the system to reset core materials in the B-theta direction with lower applied currents. Initial results were performed on a 300 kV pulser at up to 50 Hz. The series injection reset modulator has demonstrated reliable operation of ferrite B-H bias at 50 volts delivering 8 amps using a bipolar stacked MOSFET switch.

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