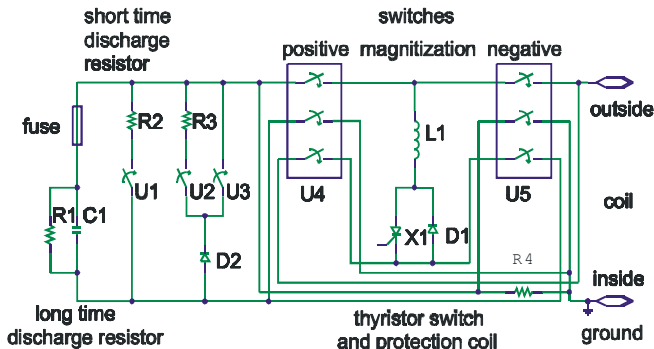


Simulations and Experimental Results

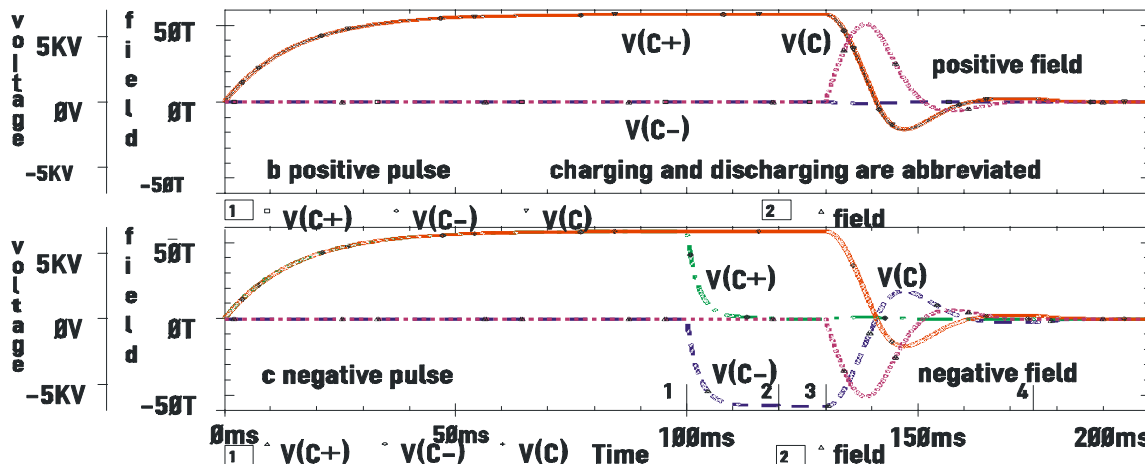


Principal circuit of one module

The particular advantage of the circuit is the possibility to reverse the polarity of the magnetic field pulse by means of a novel circuit with industrial circuit breakers. The capacitors will be charged both for positive field and for negative field with the same polarity, required by the special design of the high energy density capacitors from Maxwell Technologies. These capacitors were chosen due to reliability criteria.

The main specifications are:

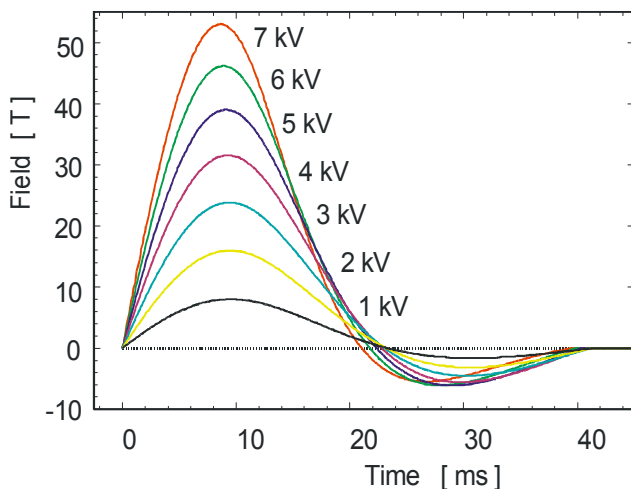
- high energy density ($0.7 \text{ MJ} / \text{m}^3$)
- metallized electrode technology
- 1.667 mF , 10 kV , 83.3 kJ
- 10 000 charge / discharge cycles at 10 kV and 30 % voltage reversal



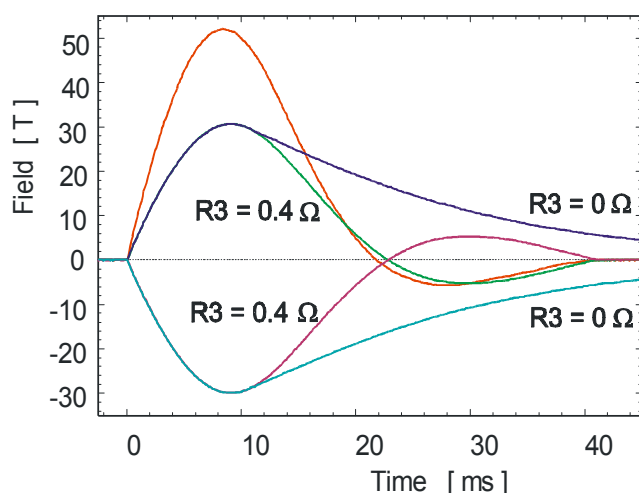
Simulation of voltages at the capacitors and field in the coil during a complete charge/discharge cycle.

Time 1: switching off of the power supply
Time 3: firing of the thyristors

Time 2: switch on negative circuit breaker
Time 4: final discharge



Simulations for several load voltages (full bank)



Experimental results with 52 T peak field and several pulses with positive and negative polarity ($\pm 30 \text{ T}$, short and long pulse R_3 crowbar resistance)

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