RADIO-FREQUENCY RADIATION FROM FCG WITH A CAPACITIVE LOAD

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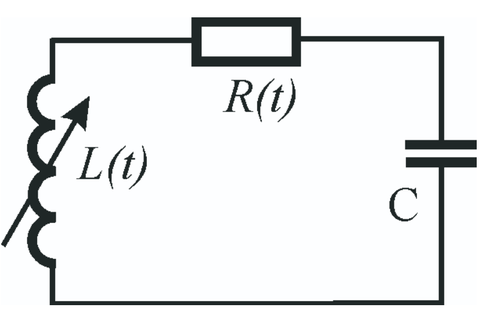
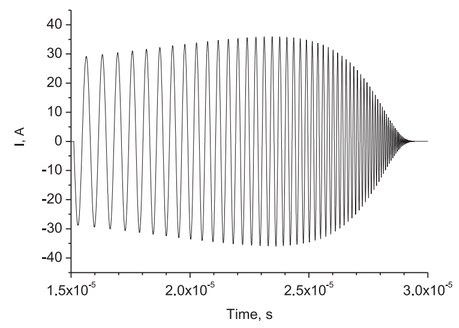
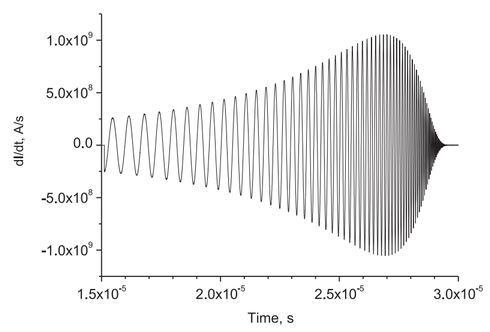
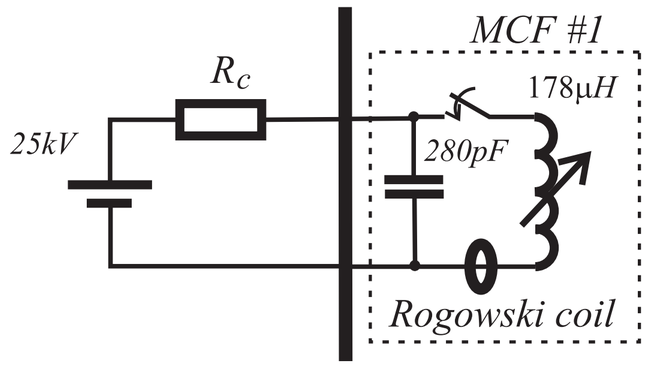


Operation of FCG with a capacituve load (magneto-cumulative generator of frequency (MCF)) is accompanied by radiative and diffusive losses. With the growth of operation frequency of MCF, the influence of losses increase and form “fish”-like dependence of the amplitude of current on operation time.

Experiments are dedicated for evaluation of losses in the circuit and increasing frequency and amplitude of oscillations.

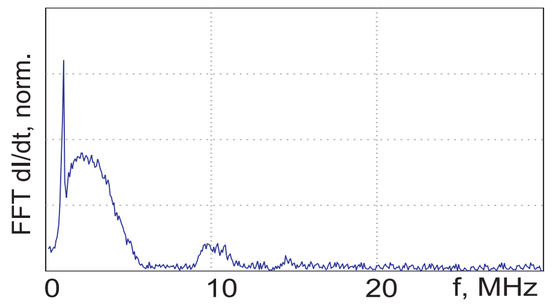


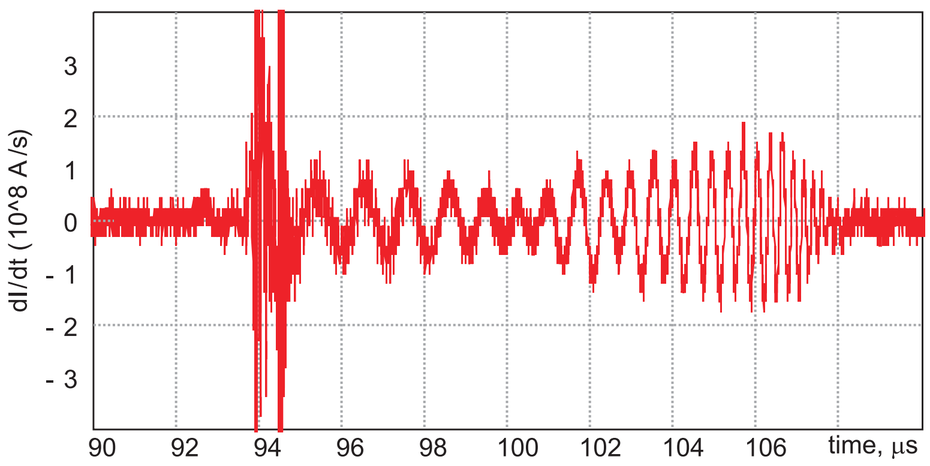


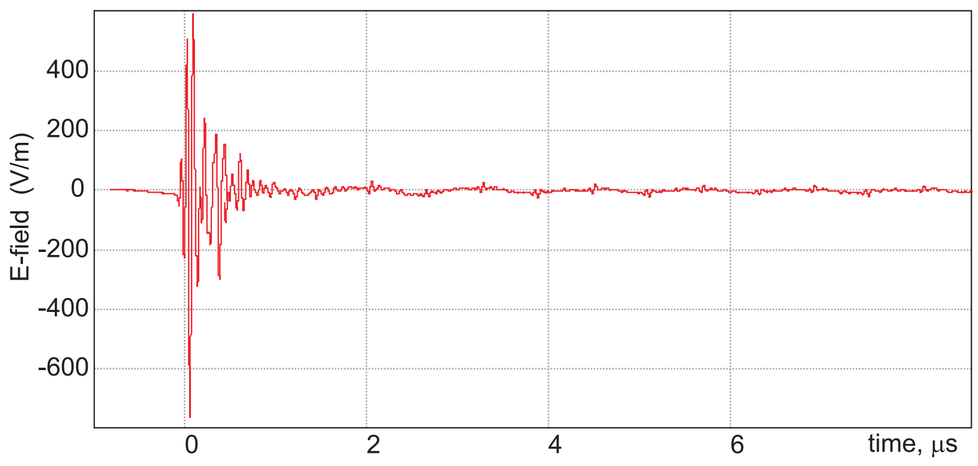


Experiment MCF #1:

- capacitance of helical FCG+antenna C=280 pF;
- antenna capacitance Ca=160 pF
- initial inductance L= 178 μHn,
- inductance at crowbar closing Lcr=100 μHn
- initial voltage 25 kV
- sensitivity of Rogowski coil 2.2nHn
- D-dot probe at 6 m from the source

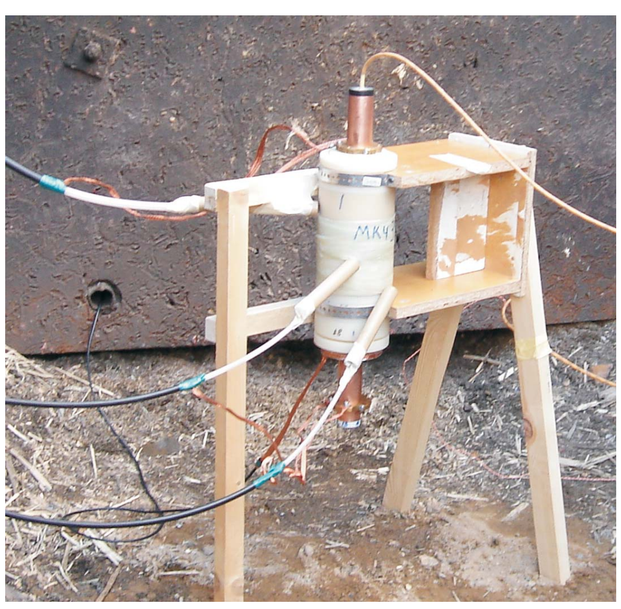


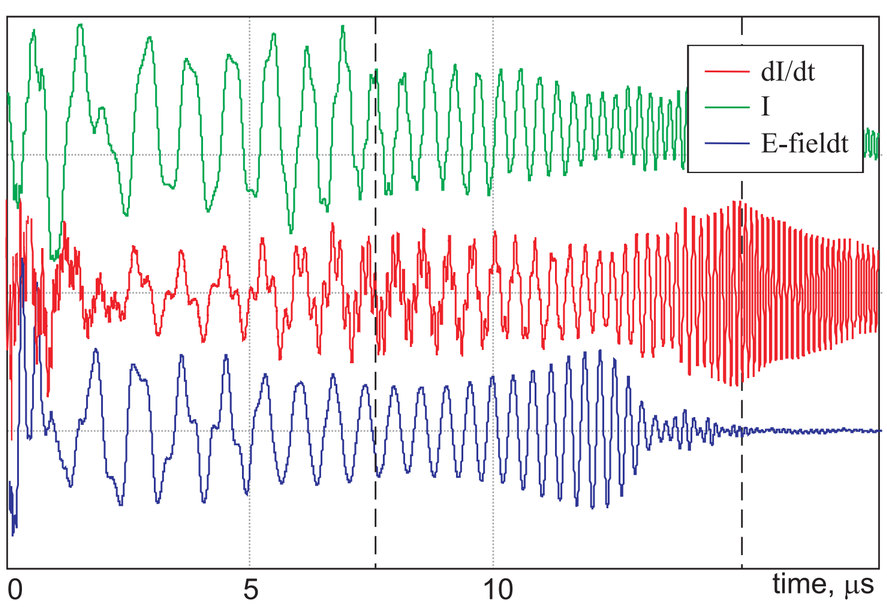


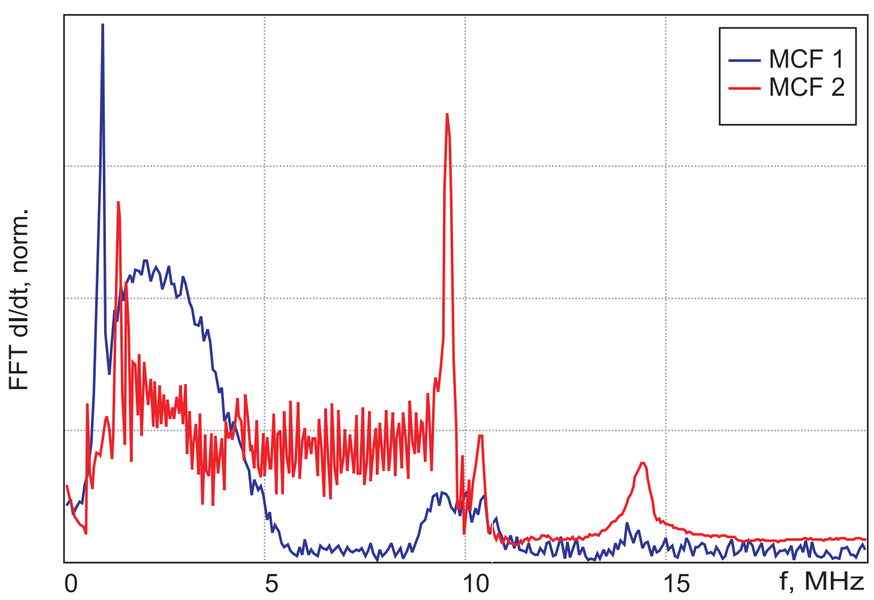


MCF #2: the goal is to seed the system with certain current.

- initial inductance L=169 μHn
- inductance at crowbar closing Lcr=100 μHn
- two capacitors C1and C2 in parallel each made of coaxial cable with capacity 240pF
- C1 is connected to stator middle point
- seed source charges C1and C2 from the external capacitor C=44nF charged to 18 kV
- start sensor triggers spark-gap, which closes the circuit and capacitor C charges C1 and C2
- simultaneously C charges the self-capacity of FCG and capacitor C3 (Ls=7.8mHn)
- C3 is used for increasing of seed time and supplying contact at crowbar closing
- seed time 26 μs
- maximal voltage at C1, C2 and C3 is 30 kV







Experiment MCF #1 demonstrates that operation of helical FCG with a capacitive load corresponds in general analysis [1], but additional losses [2] present in the circuit drastically reducing initial current and radiation frequency.

Experiment MCF #2 demonstrates that change of seed circuit and elimination some types of losses enables increasing oscillation amplitude and frequency, but two thirds of MCF operation time is lost for holding current and voltage at initial level. This suggests the idea of shortening FCG operation time.

MCF#3 is a small FCG with axial initiation, which is designed to provide shorter FCG operation time. Experiment with MCF#3 is under preparation.

[1]V.G.Baryshevsky, A.A.Gurinovich /Proceedings of Megagauss-12 (2006)
[2] V.Baryshevsky, D.Baryshevsky, A.Gurinovich et.al/ Proceedings of Megagauss-13 (2010)