



Fast Kicker For High Current Beam Manipulation: Experimental Facility

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Friday, May 4, 2018, Vancouver, BC, Canada

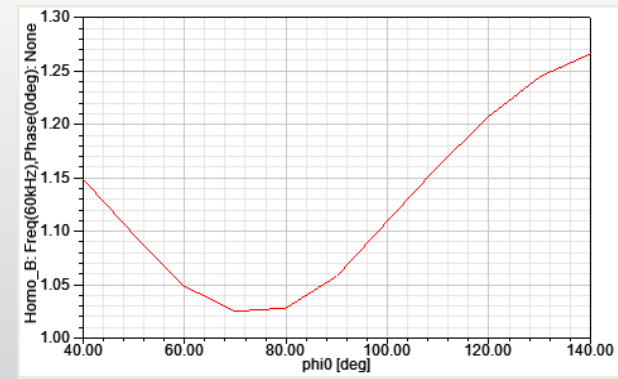
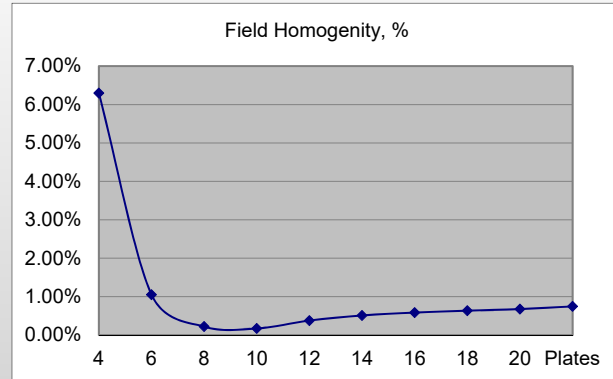
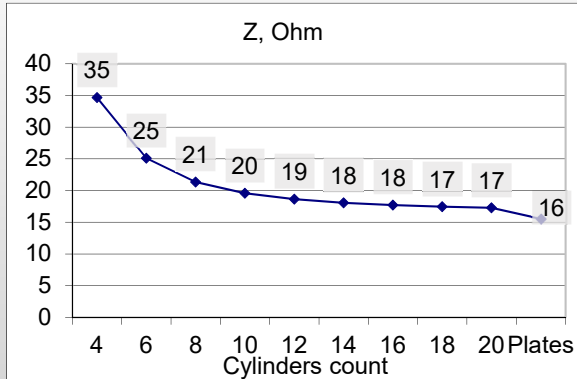
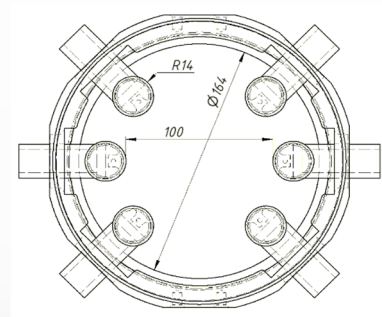
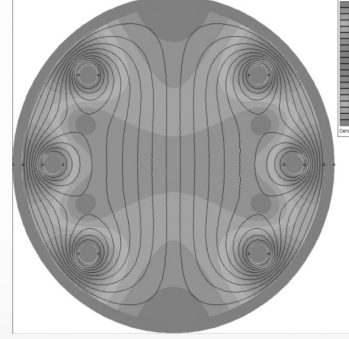
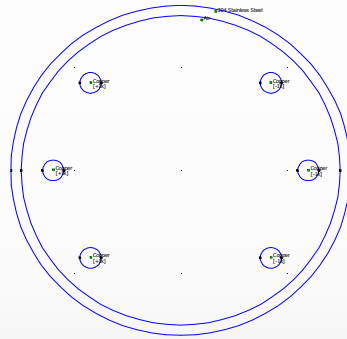
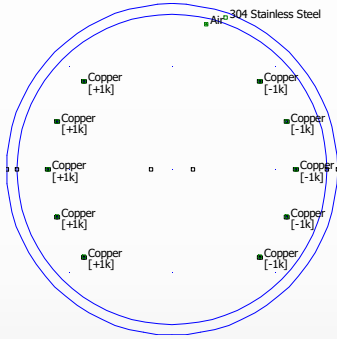
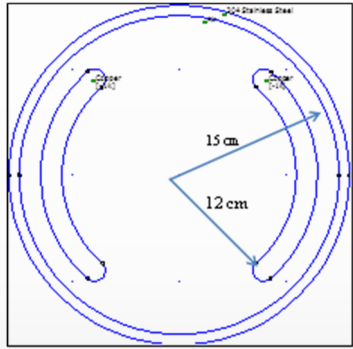


Outline

- Kicker design
- Magnetic field measurements
- Beam simulations
- Experimental facility
- Summary

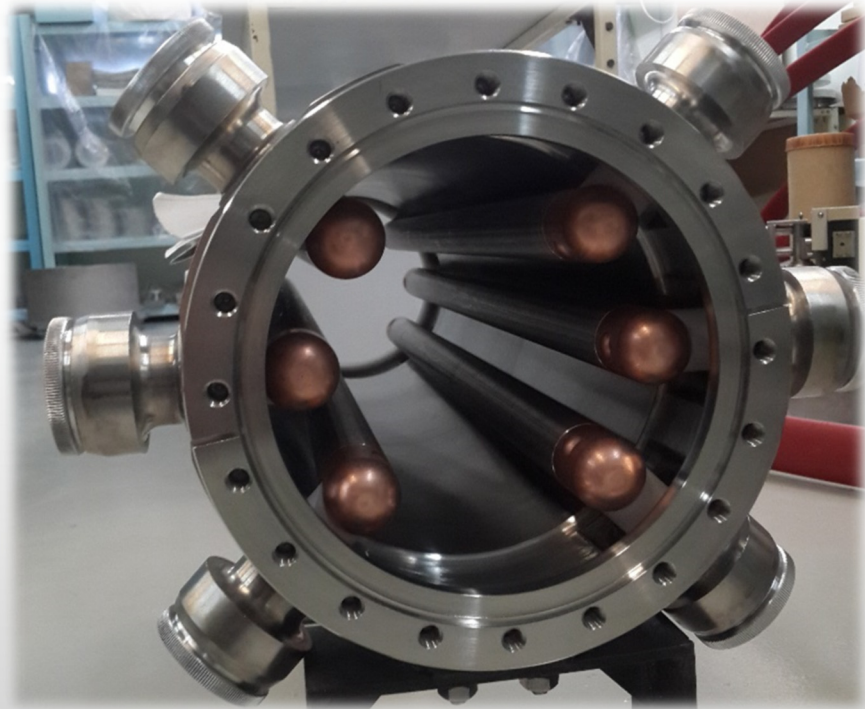
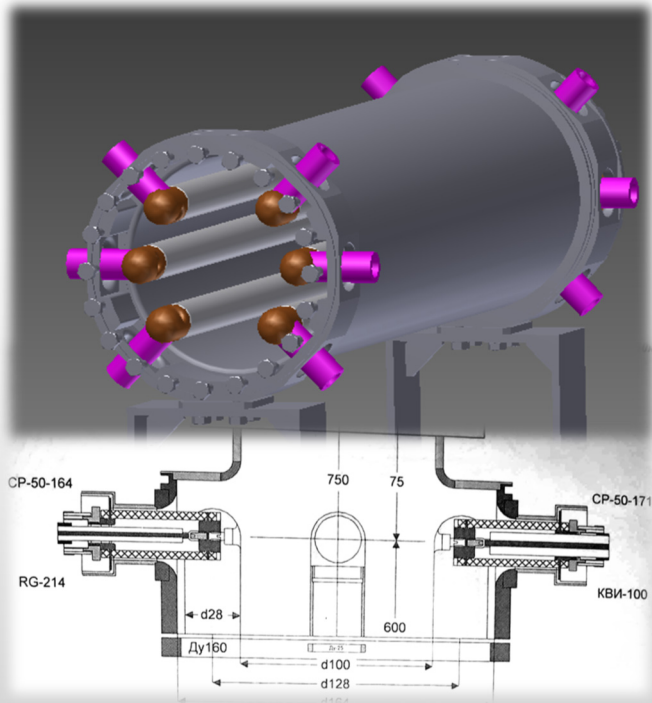


Kicker design

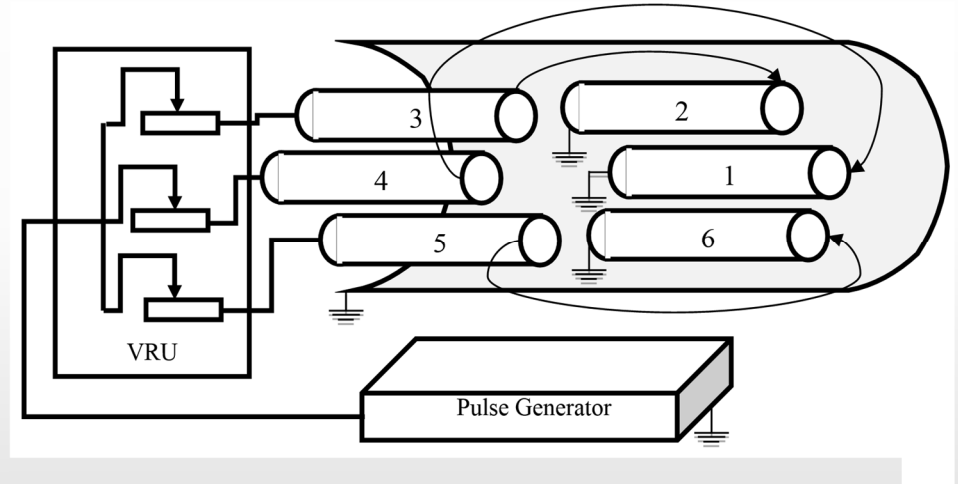
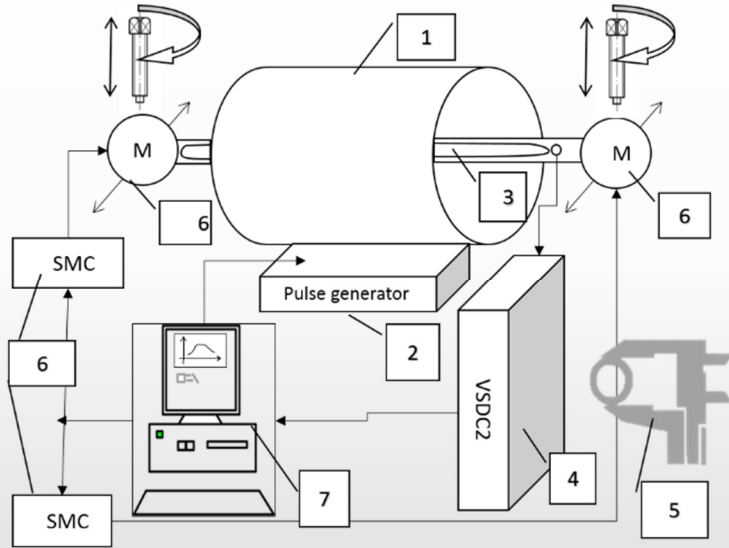




Kicker design

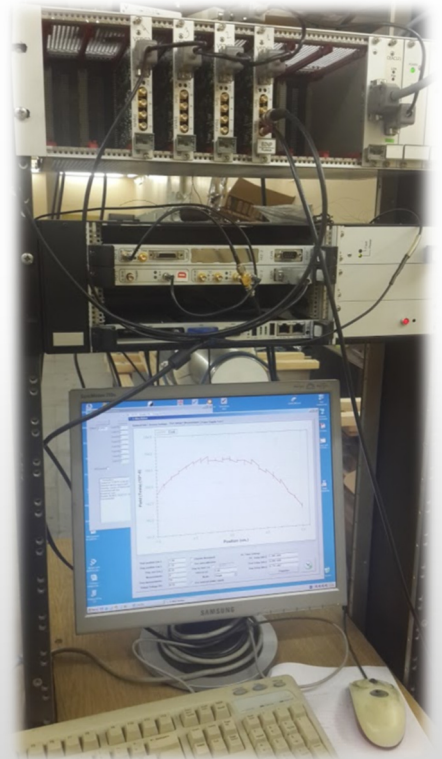
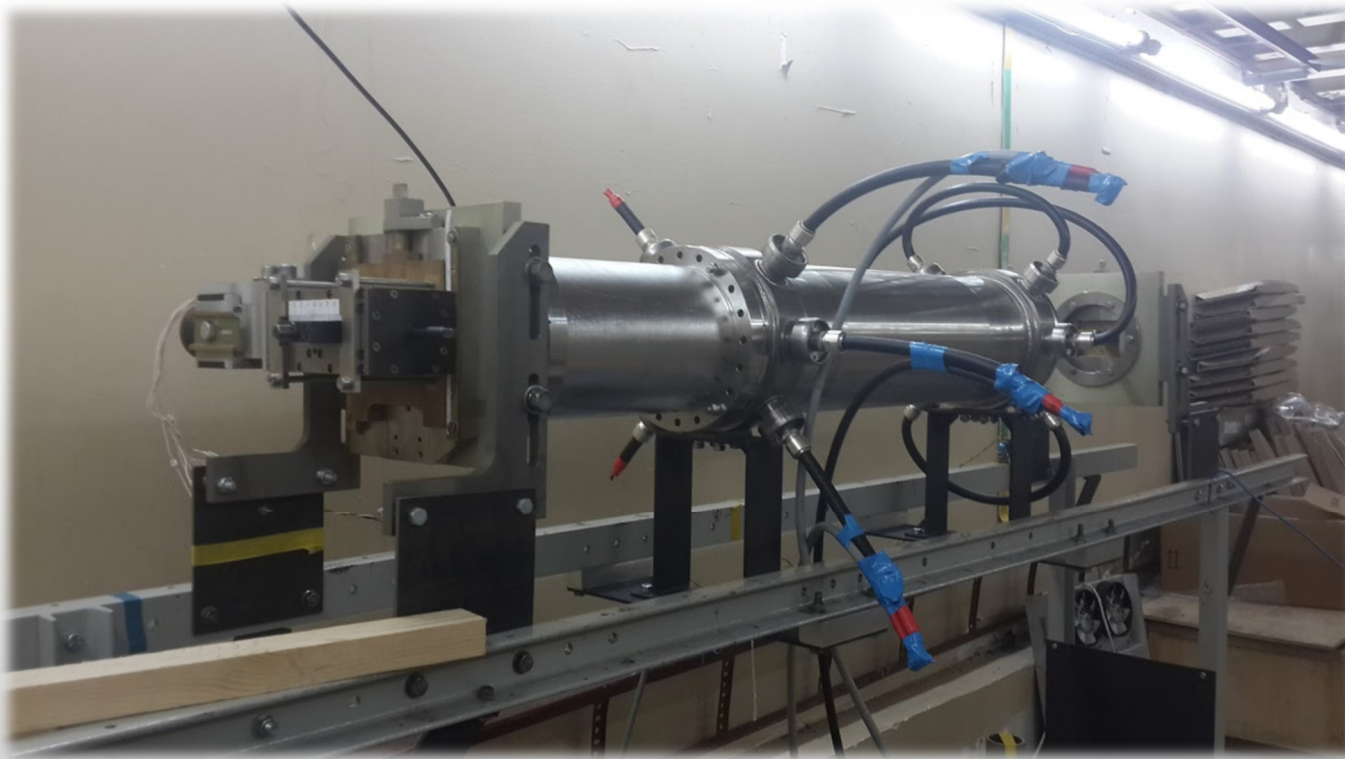


Magnetic field measurements



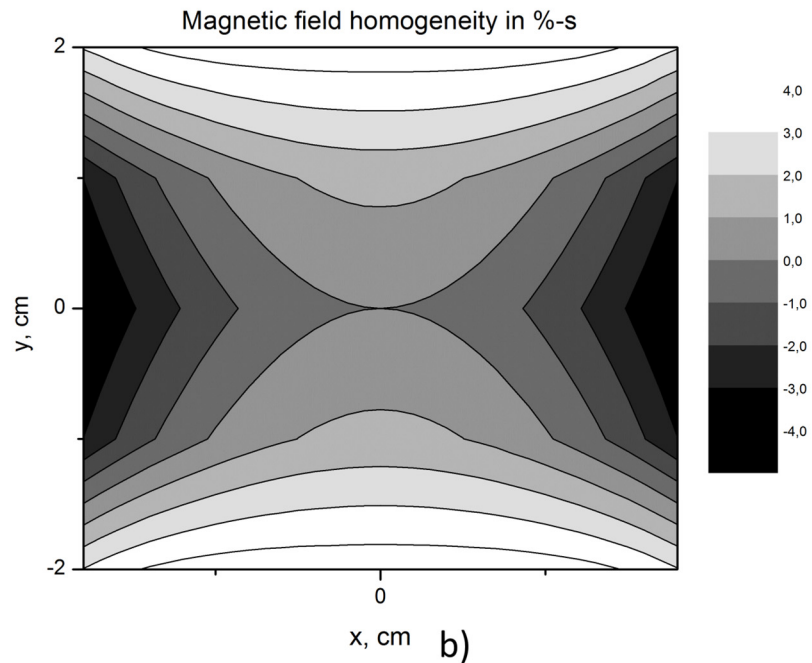
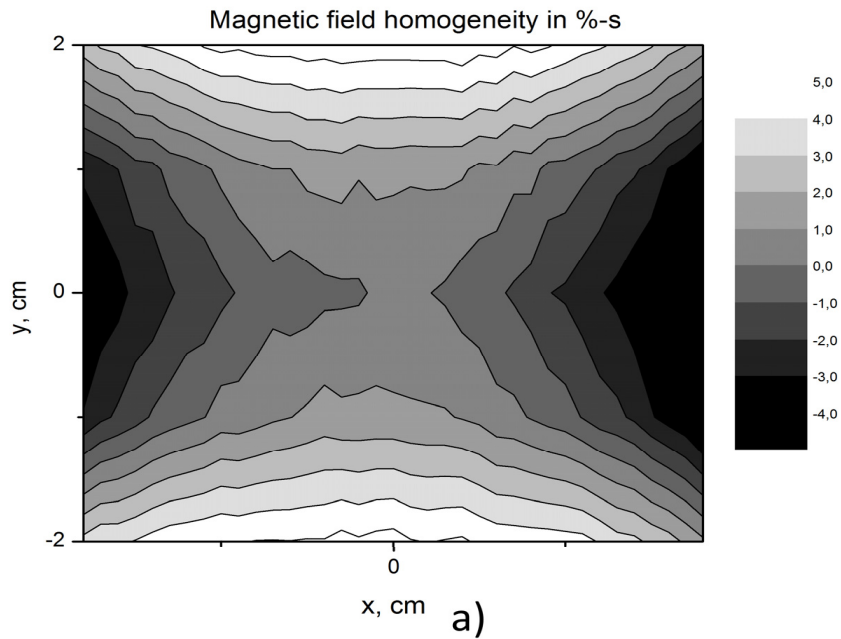


Magnetic field measurements



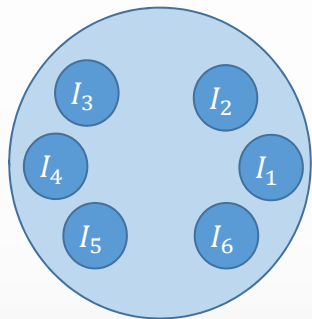


Magnetic field measurements





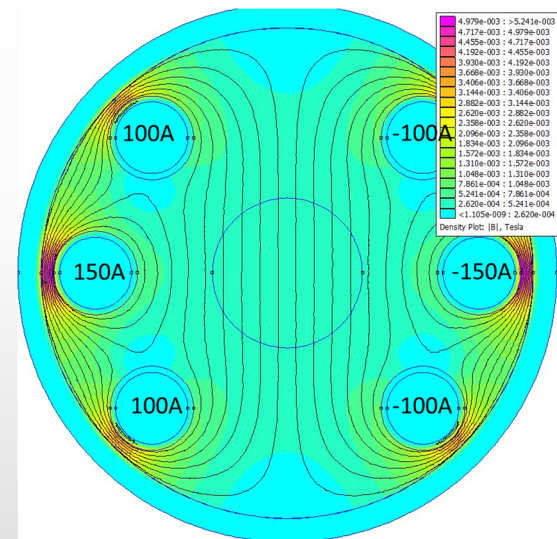
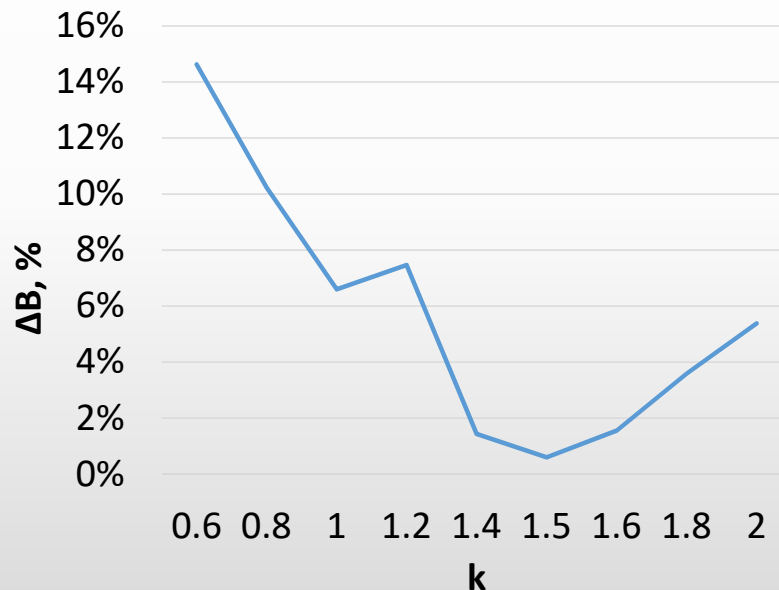
Magnetic field measurements



$$\Delta B = \frac{B_{max} - B_{min}}{B_{min}} \cdot 100\%$$

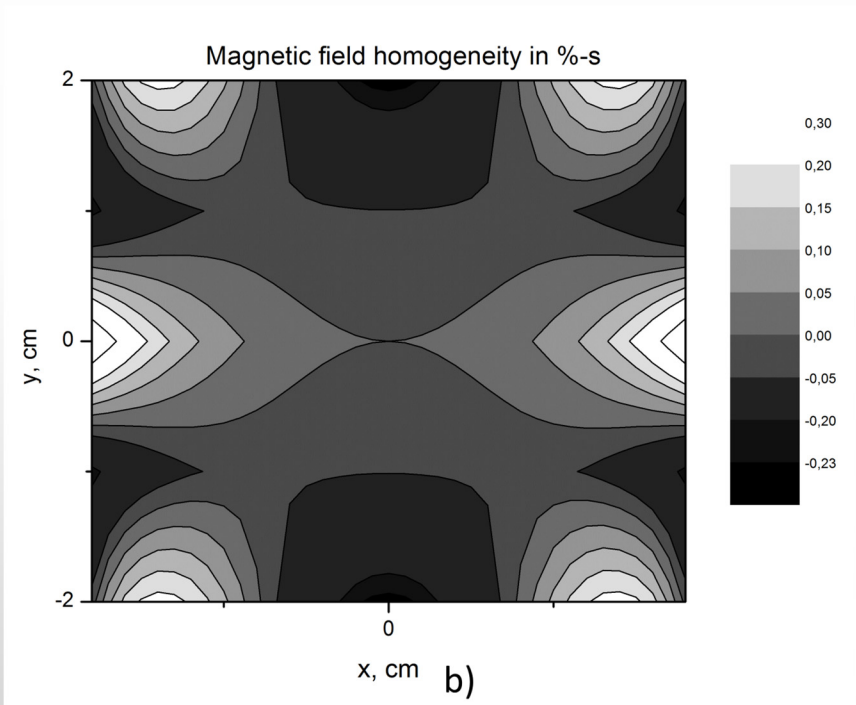
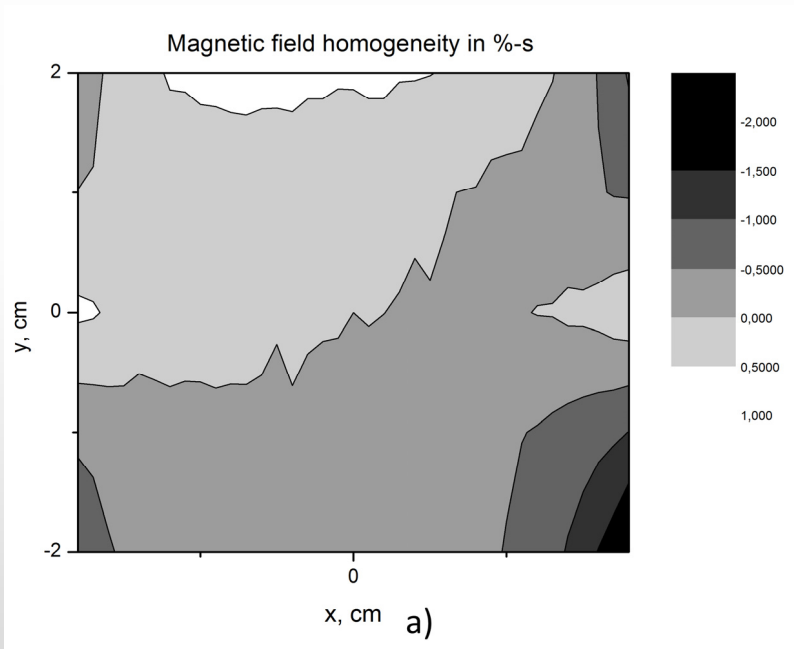
$$I_2 = I_6 = -I_3 = -I_5 = I_0$$

$$I_1 = -I_4 = kI_0$$



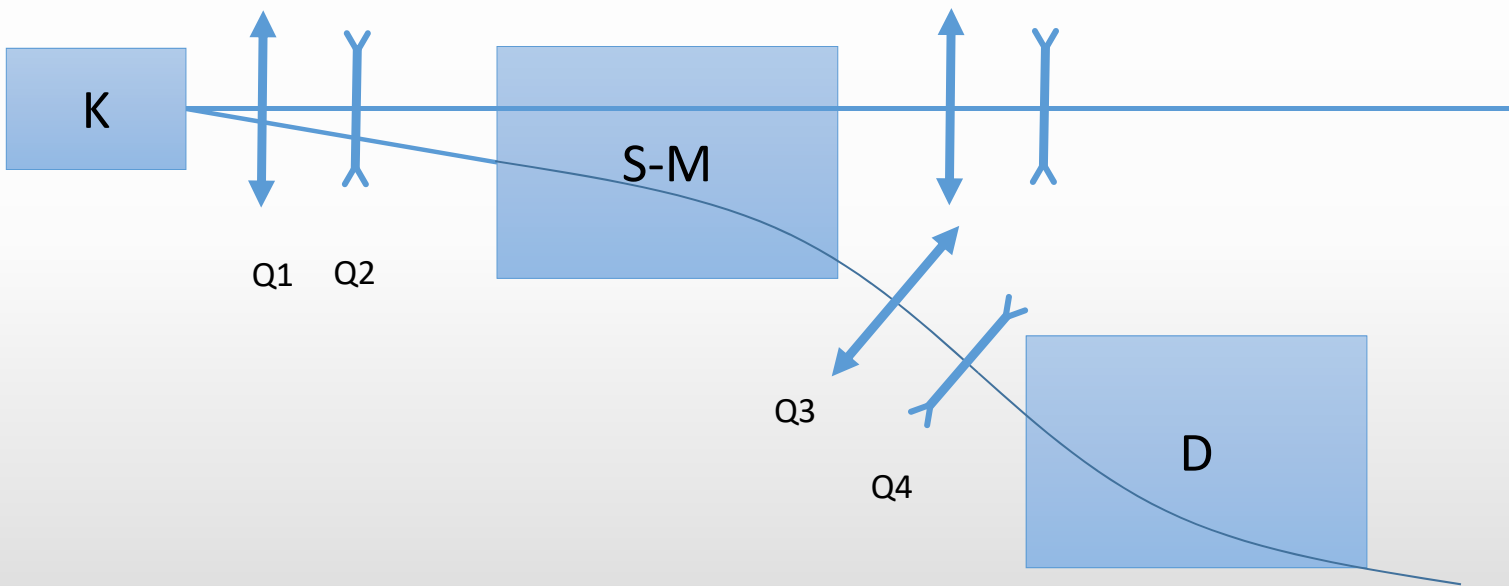


Magnetic field measurements



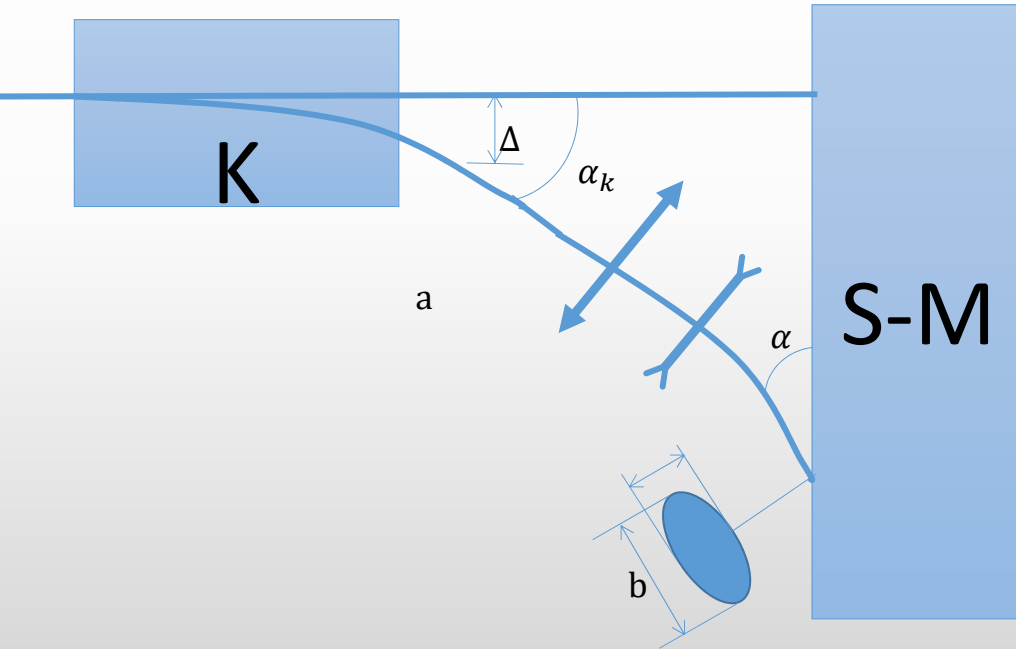


Experimental facility lattice



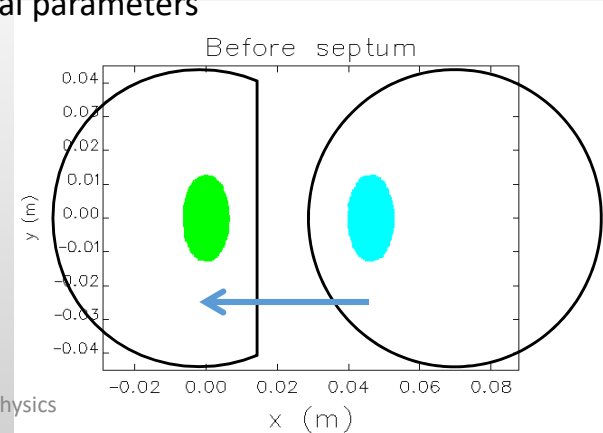


Beam simulation. Elegant



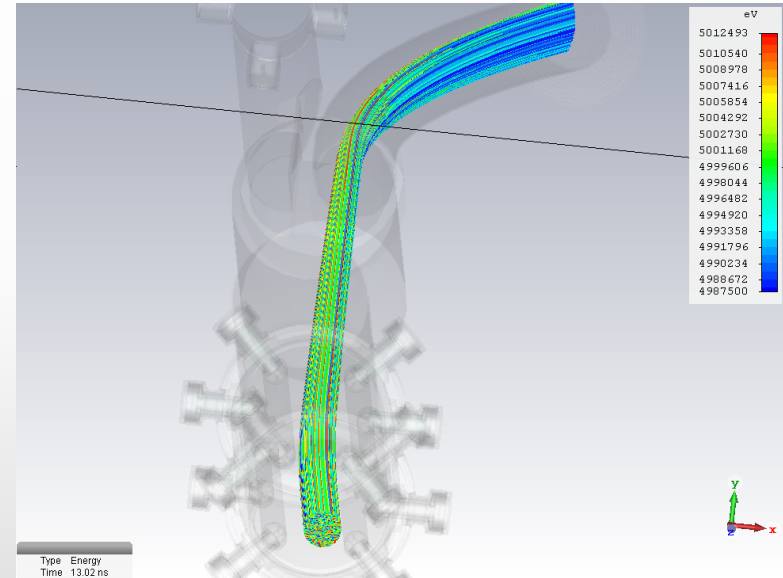
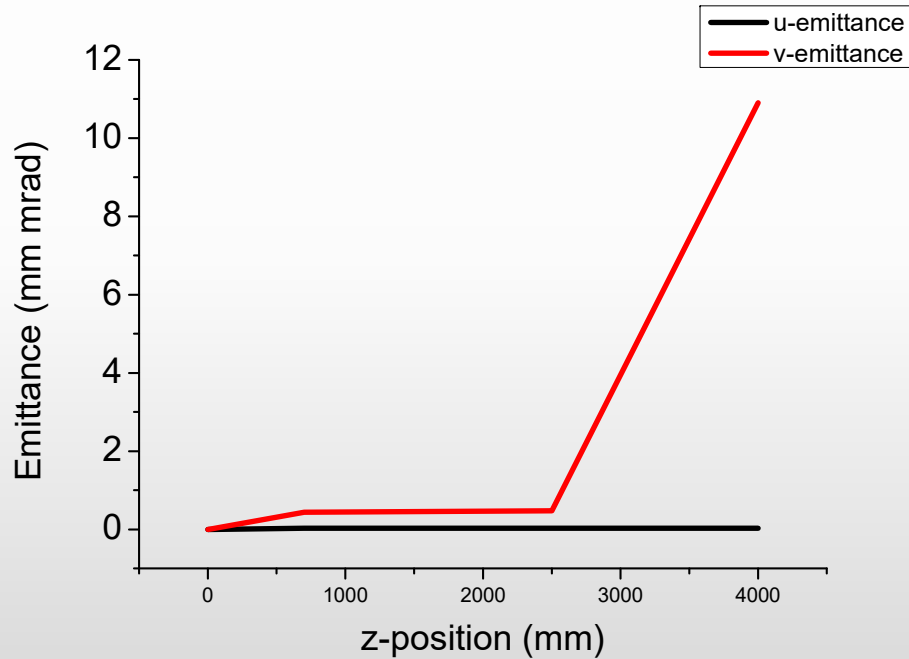
#	α	α_k	Δ , mm	a, mm	b, mm
1 (*)	1.3°	0.61°	46	5	17.5
2	1.1°	0.52°	46	13	25
3	1.3°	0.61°	55	15.2	25.4
4	0.5°	0.91°	50	13	25

*Initial parameters



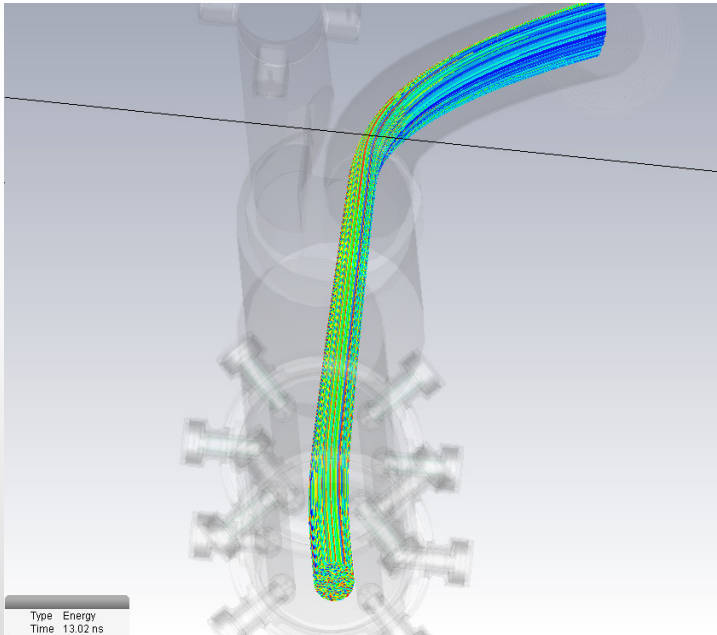


Beam simulation. CST Studio

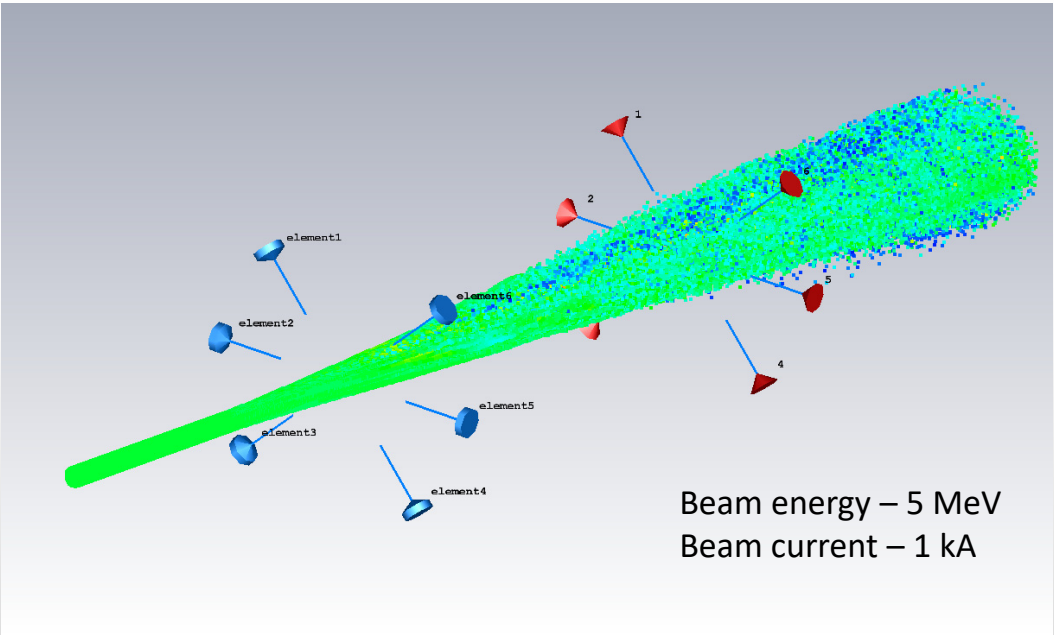




Beam simulation. CST Studio



TRK-solver



PIC-solver

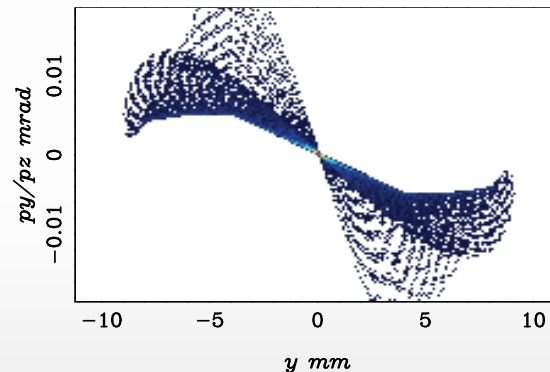
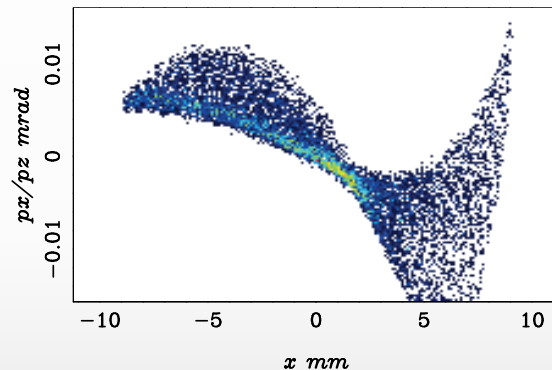


Beam simulation. ASTRA

Transverse Phase-Space

5 MeV

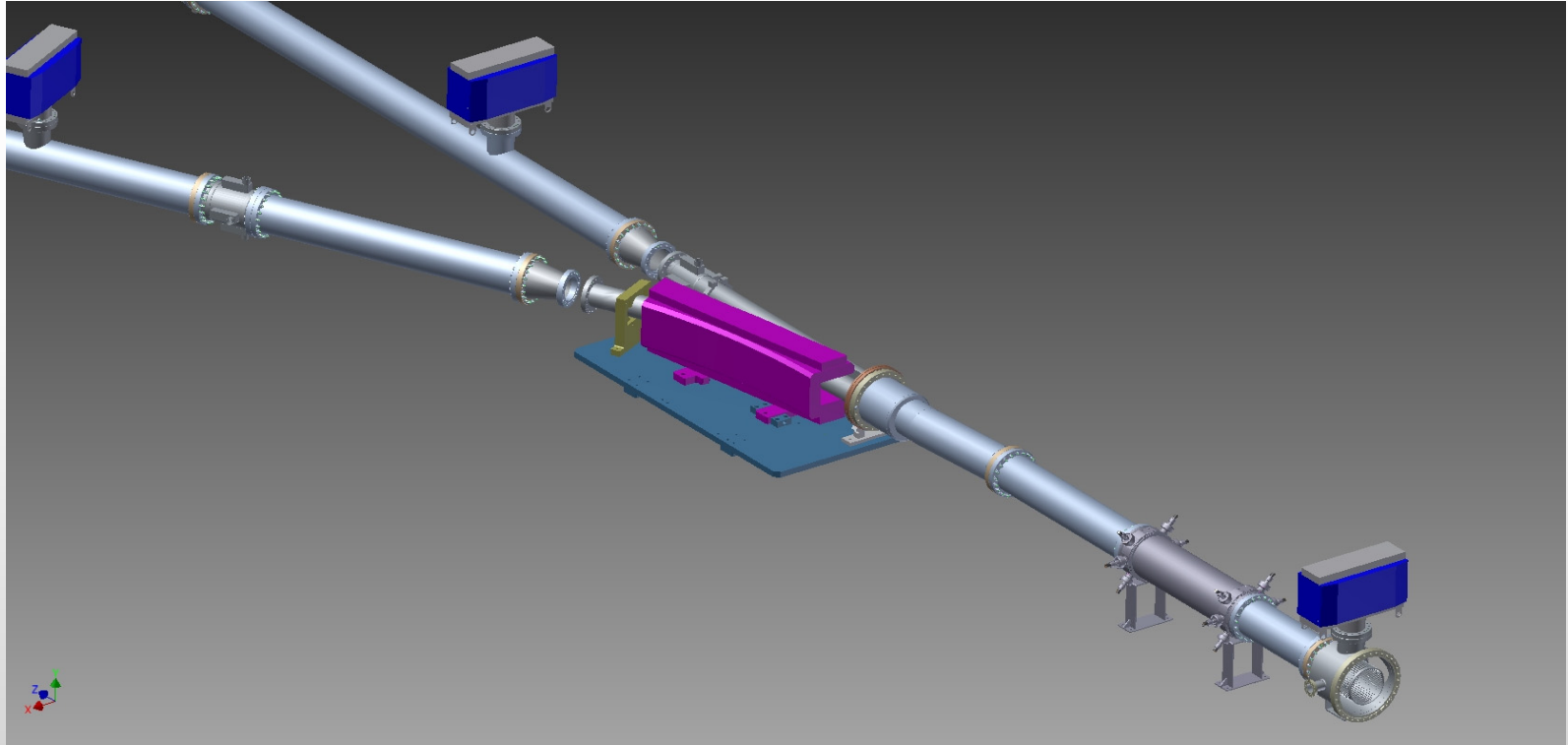
Transverse Phase-Space



Currents in cylinders	ϵ_x , mm mrad	ϵ_y , mm mrad	Angle, °
120A/86A for 5 MeV	0.2	0.198	2.8993
359A/258A for 20 MeV	0.44	0.4	2.26779



Experimental facility

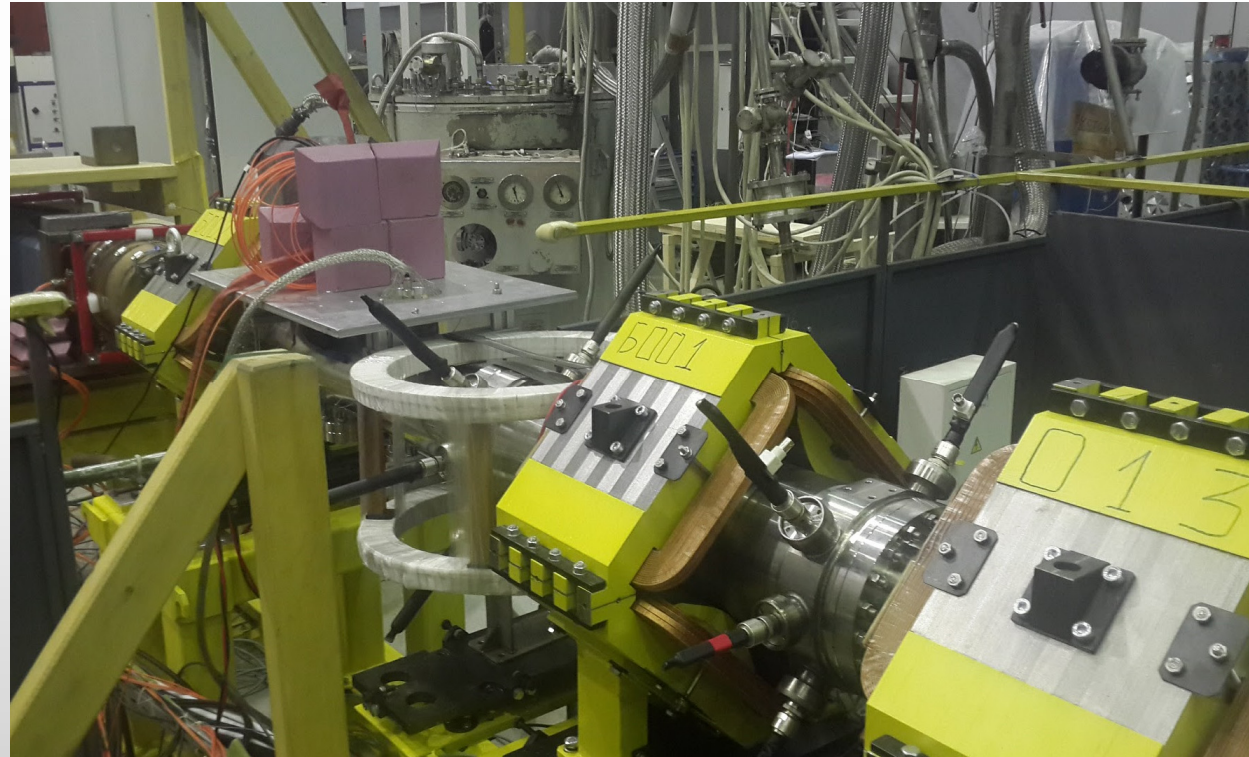




Experimental facility



4 May 2018, IPAC 2018



V. Gambaryan. Budker Institute of Nuclear Physics



Summary

- In our institute was worked out new kicker design and kicker was developed
- Magnetic measurement was prove field quality refinement method.
- We have some problems with beam simulations
- The development of the experimental setup is at the final stage
We will start the experiments with kicker in May-June