THE CONCEPTUAL DESIGN OF THE 7.5 MEV/U LIGHT ION INJECTOR

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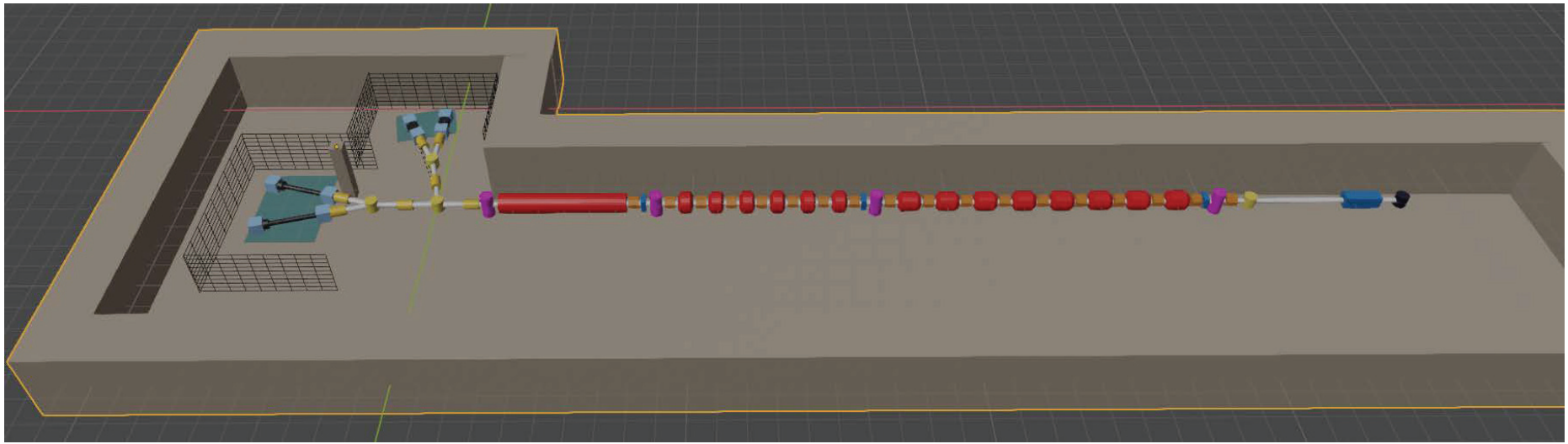
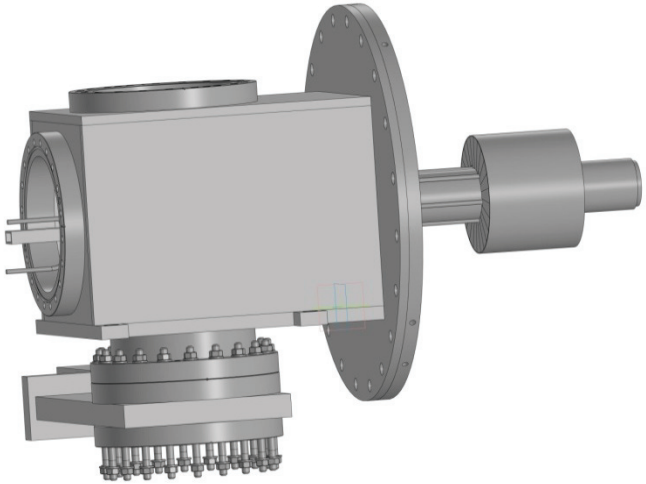
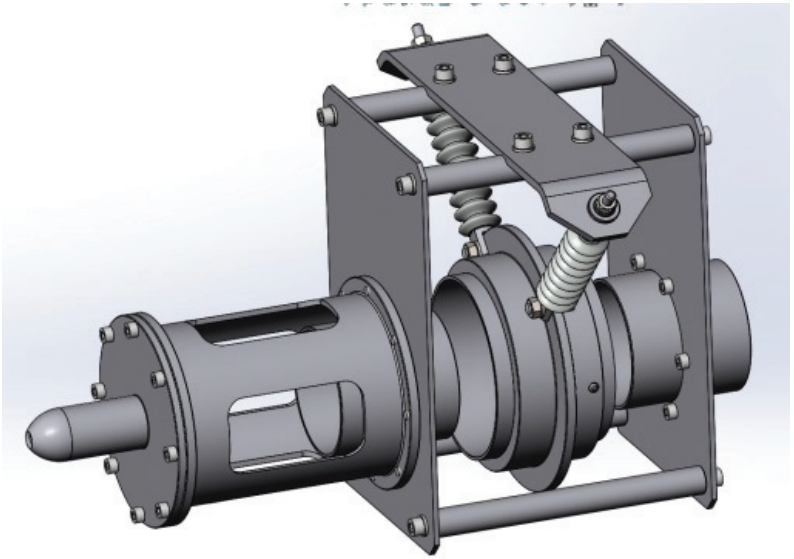
LU1 layout

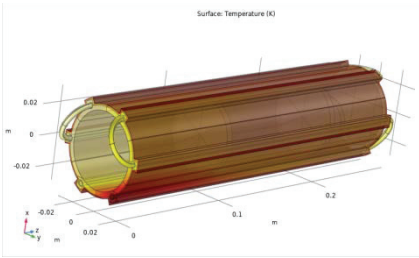


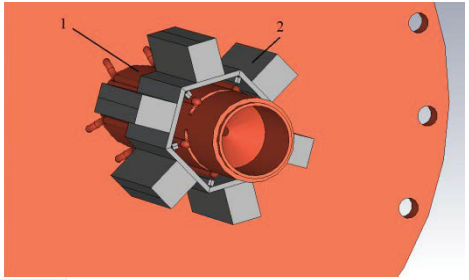
LU1 linac will accelerate ions form protons to oxygen up to energy of 7.5 MeV/nucleon with mass-to charge ratio A/Z<3.5

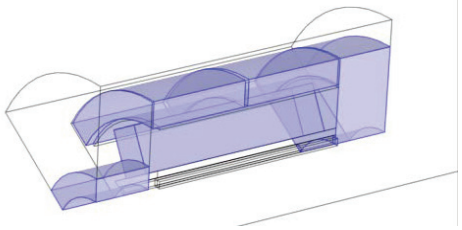
2,45 GHz ECR ion source for p^+ and He^{2+}

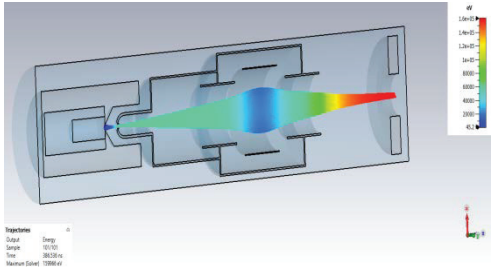




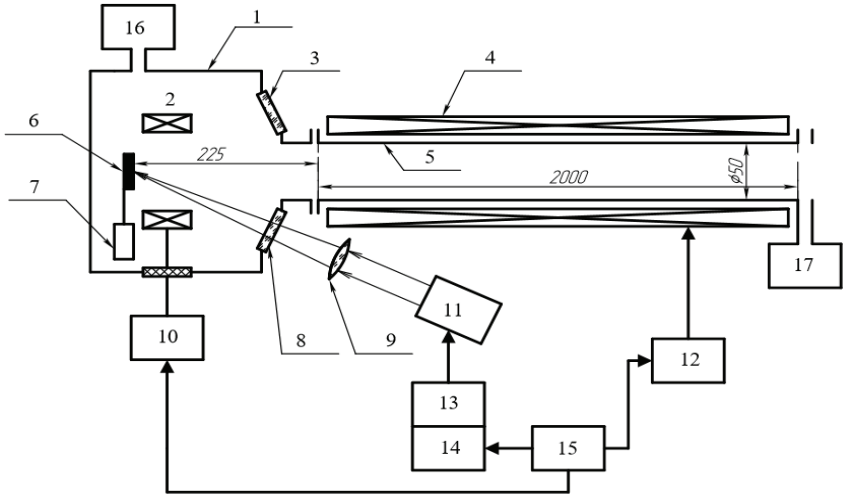


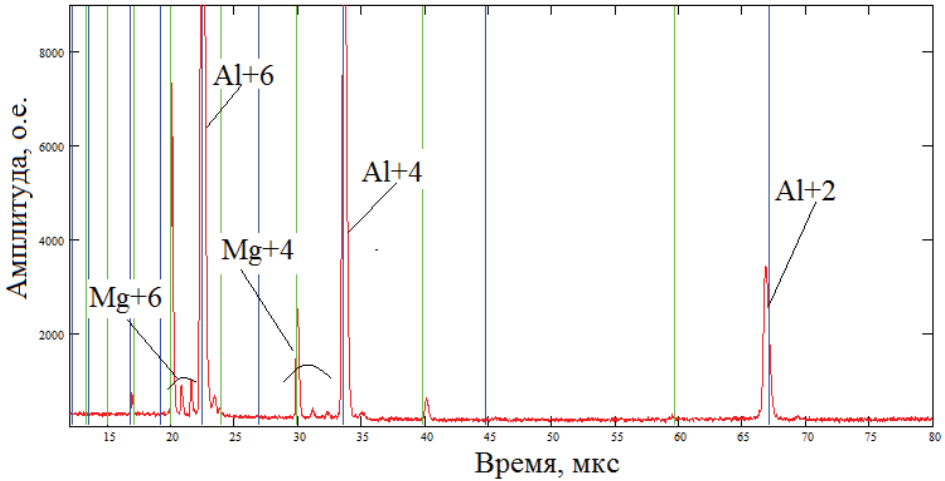


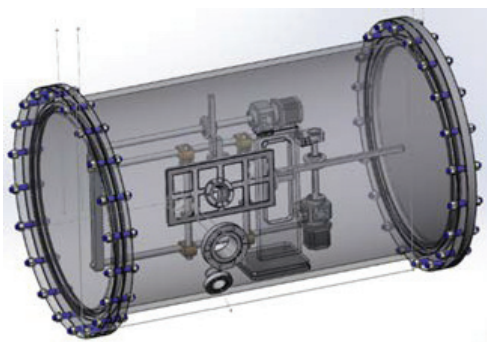


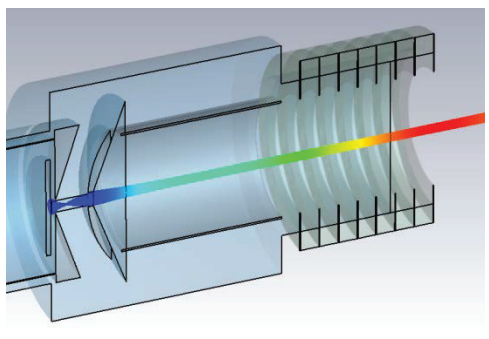


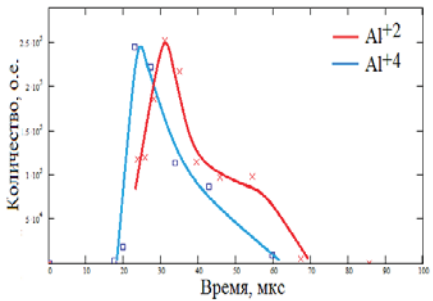
Laser ion source: from Li to O

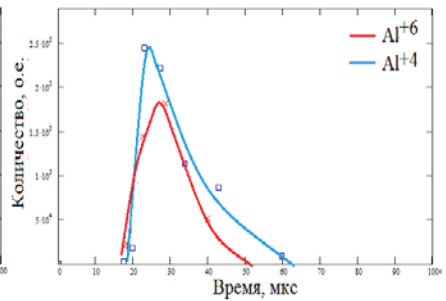




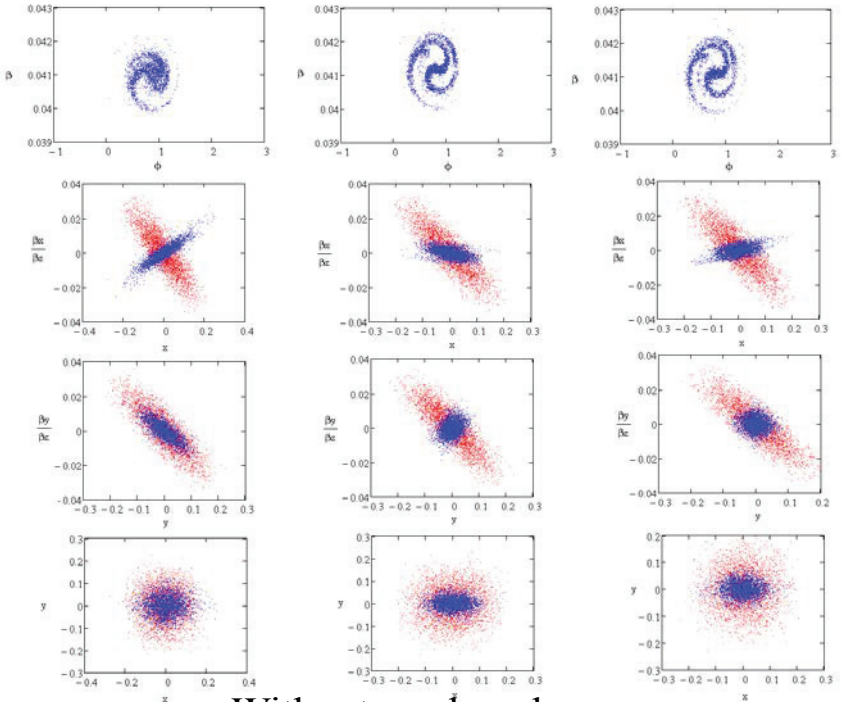




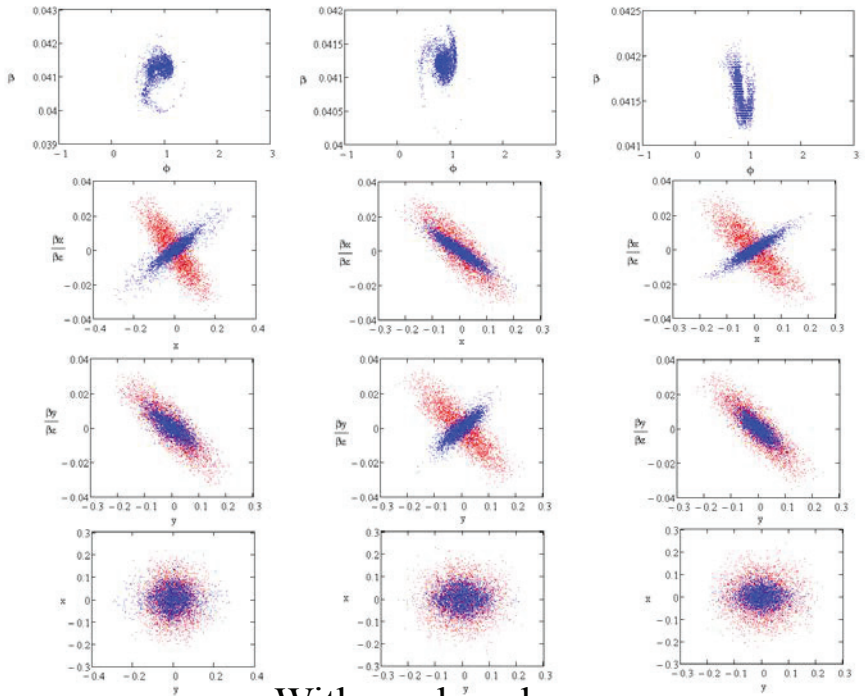




RFQ section: beam dynamics



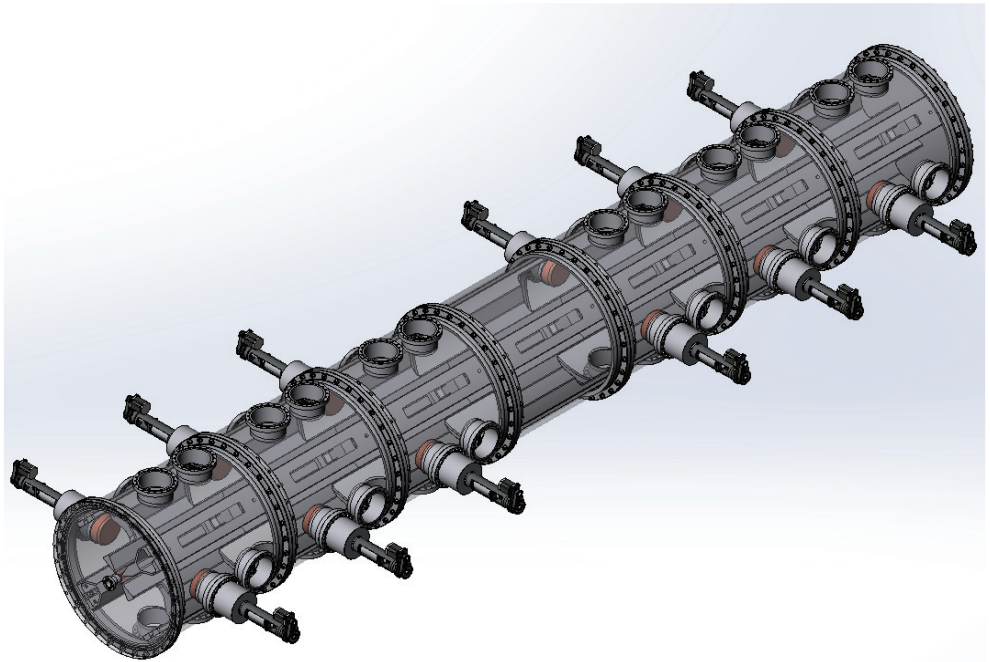
Without pre-buncher

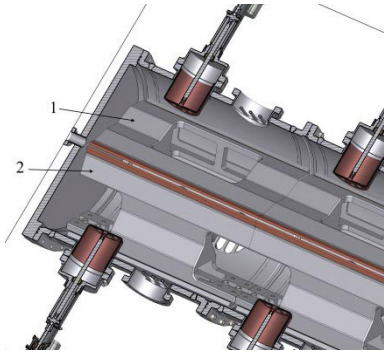


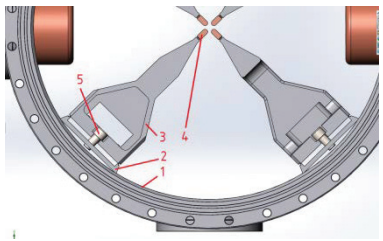
With pre-buncher

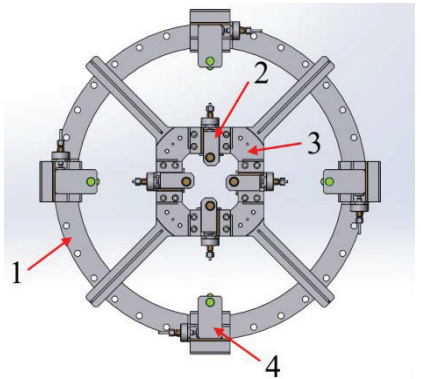
Beam dynamics simulation results for LU1 RFQ: A/Z=1, I=10 mA (at left), A/Z =2.0, I=1 мА (at center), A/Z=3.5, I=1 мА; all simulation were done with pre-buncher before RFQ; it are shown (top-to-bottom): longitudinal emittance, transverse emittances and the beam cross-section; all parameters are plotted by red color for the front-end of the RFQ and by blue color for the output

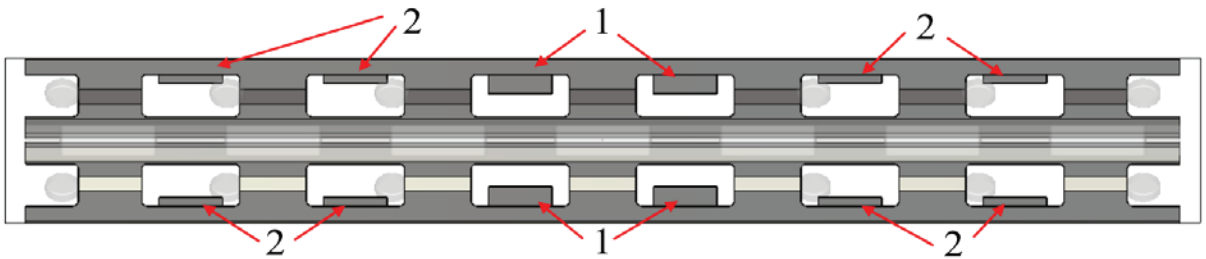
RFQ section: cavity

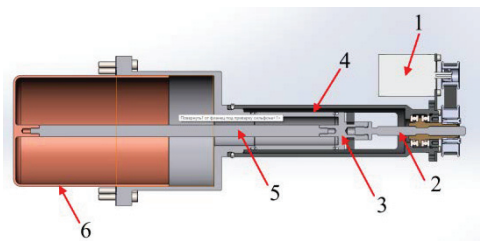




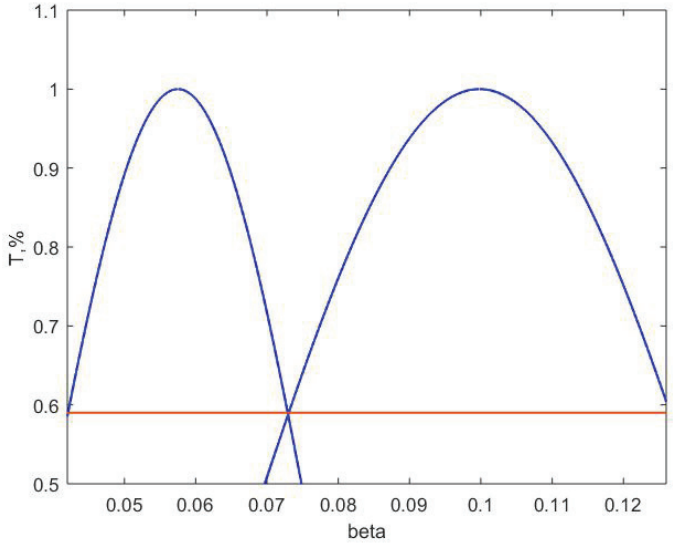




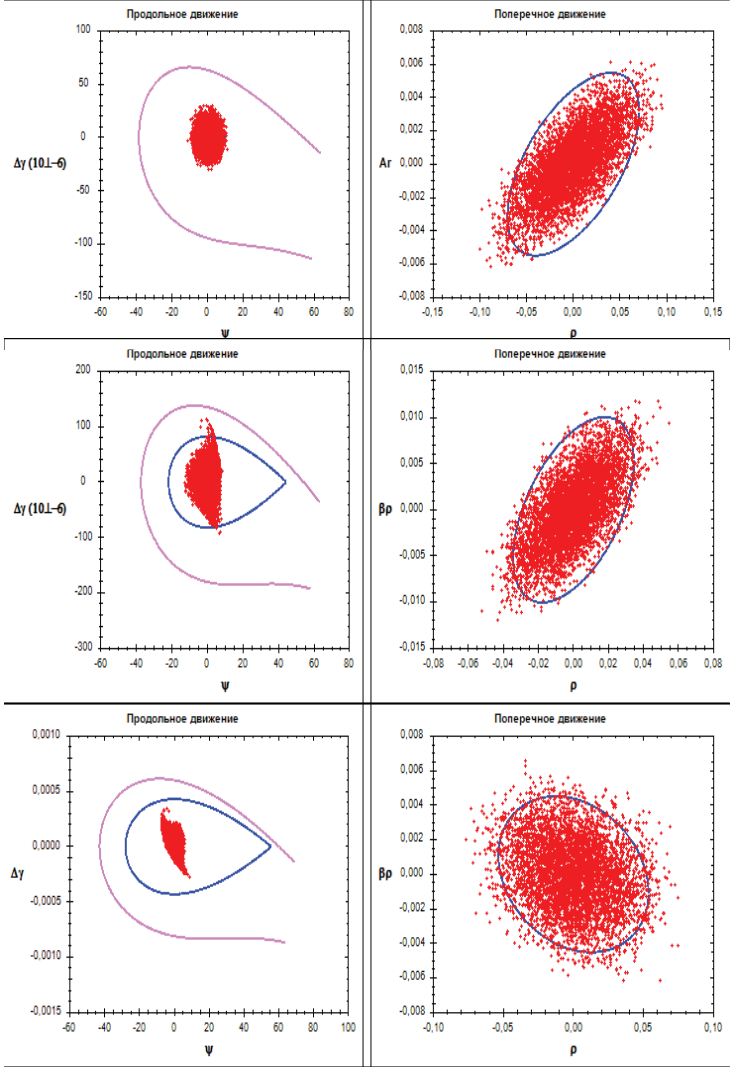




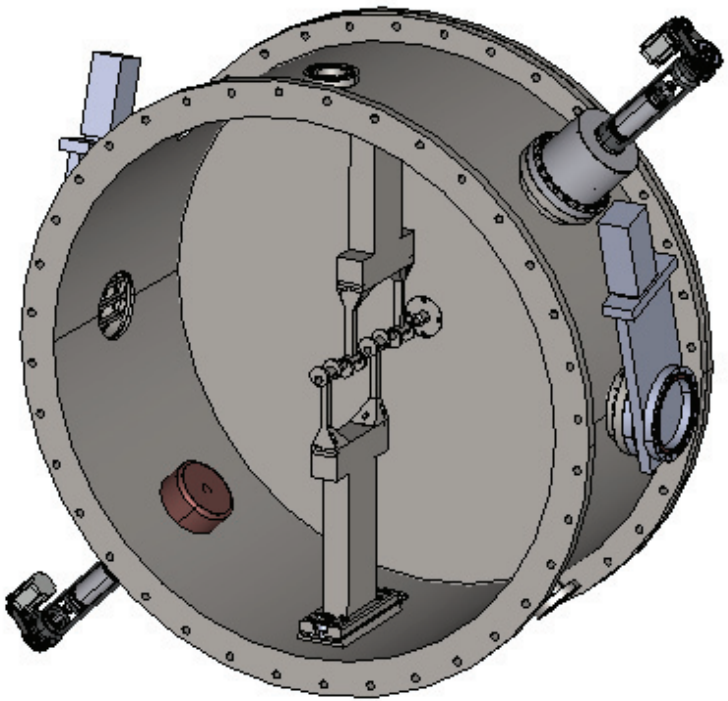
Regular part: beam dynamics

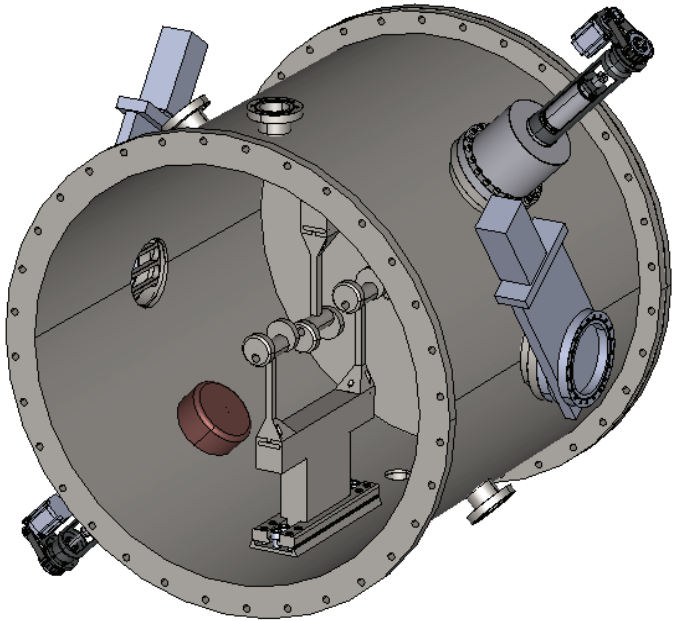


The regular part of the linac will consists of two groups of IH-cavities with geometrical velocities βg=0.057 (six 5-gap cavities) and 0.099 (eight 5-gap cavities) to achieve the final energy of 7.5 MeV/nucleon

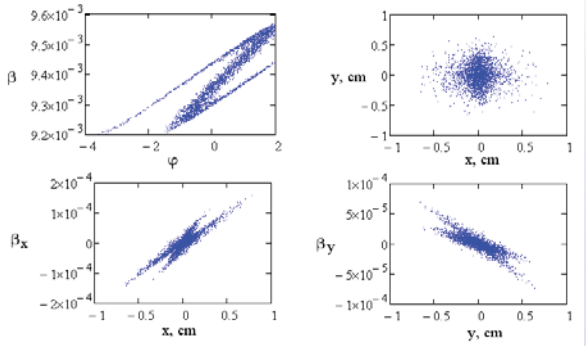


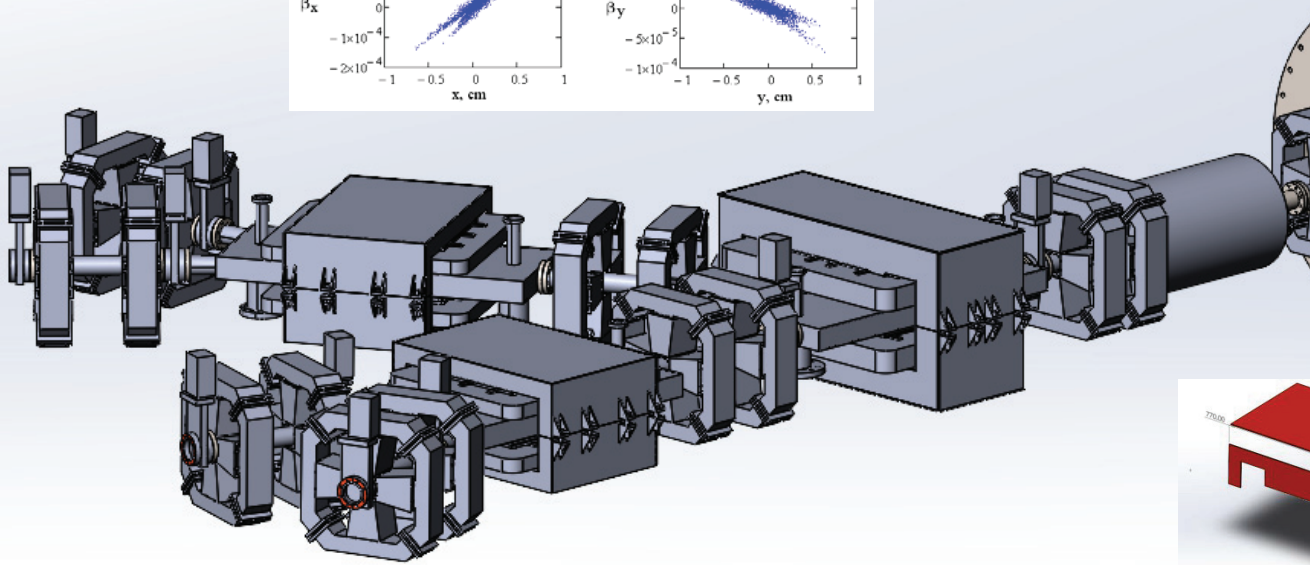
IH-cavities

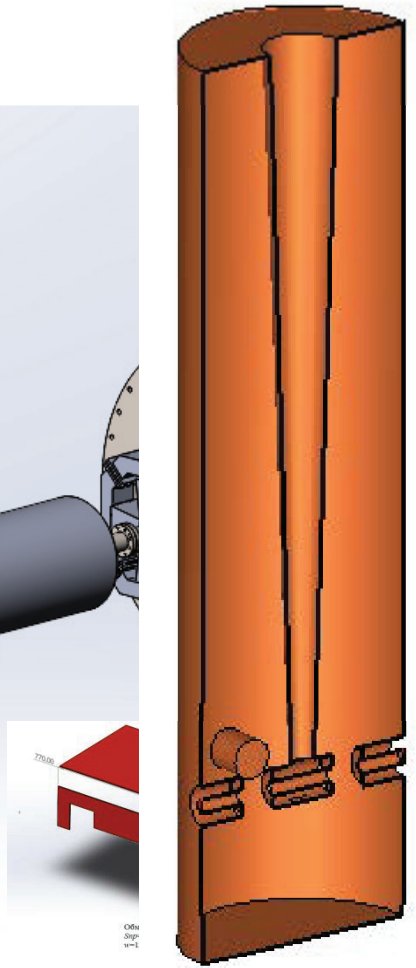




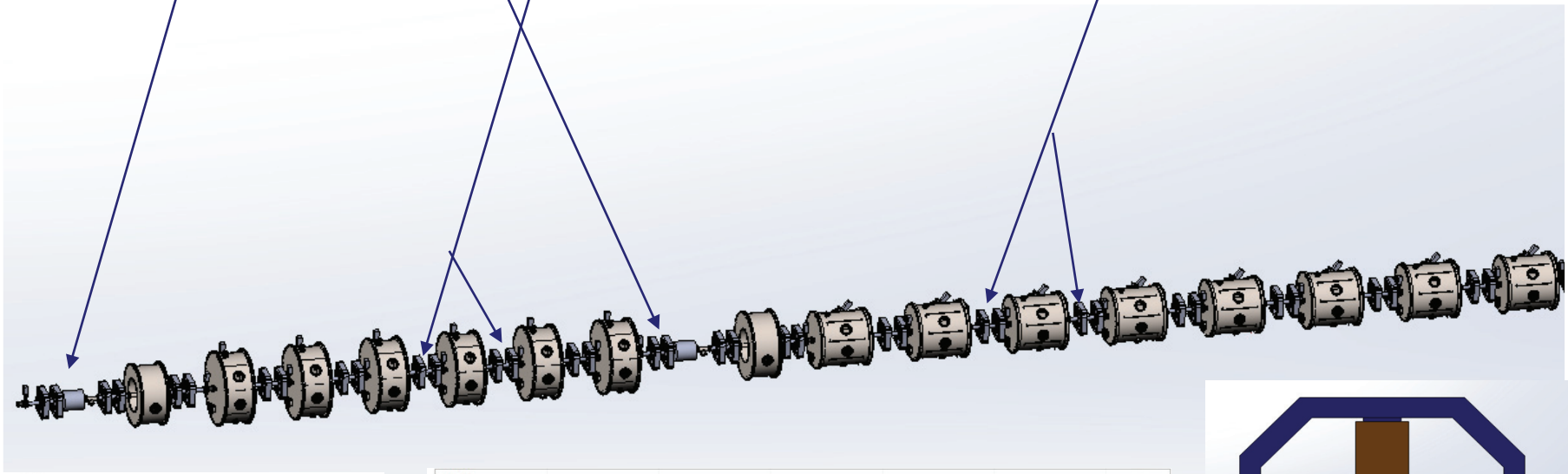
LEBT

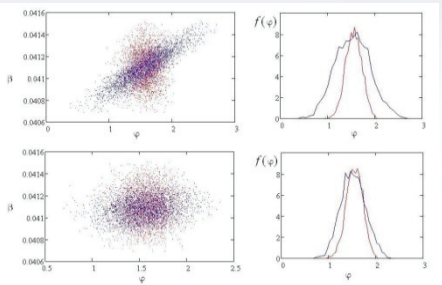


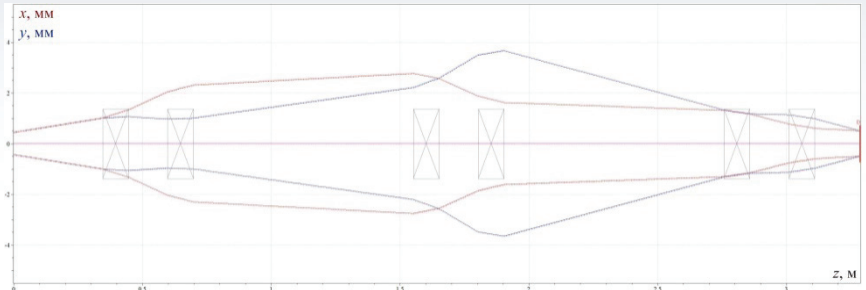


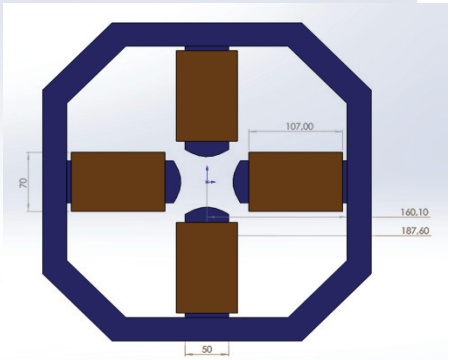


MEBT-1, MEBT-2, channels between IH-cavities

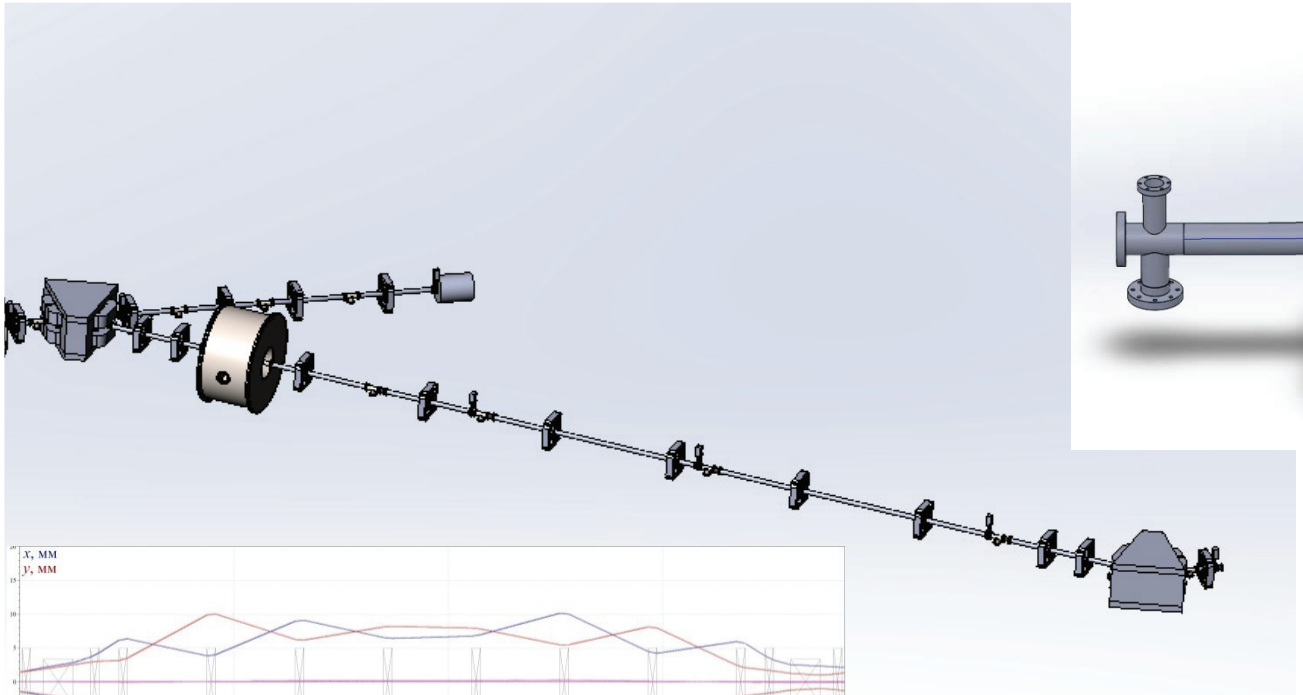


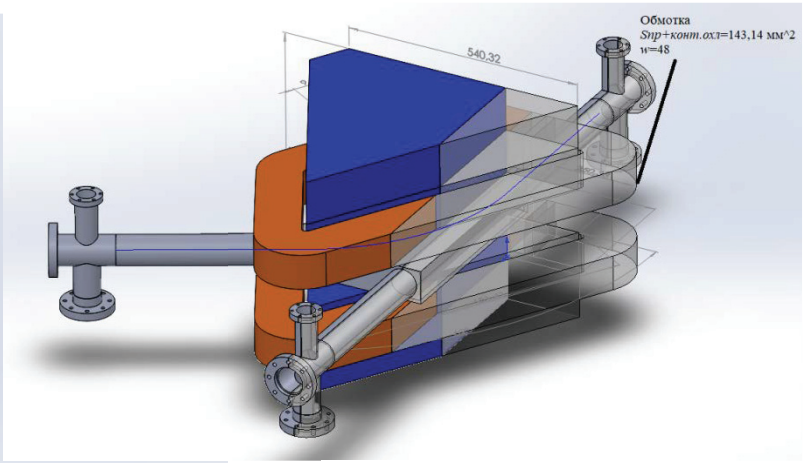


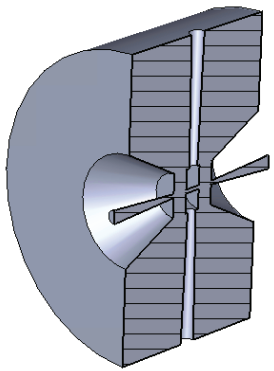




НЕВТ

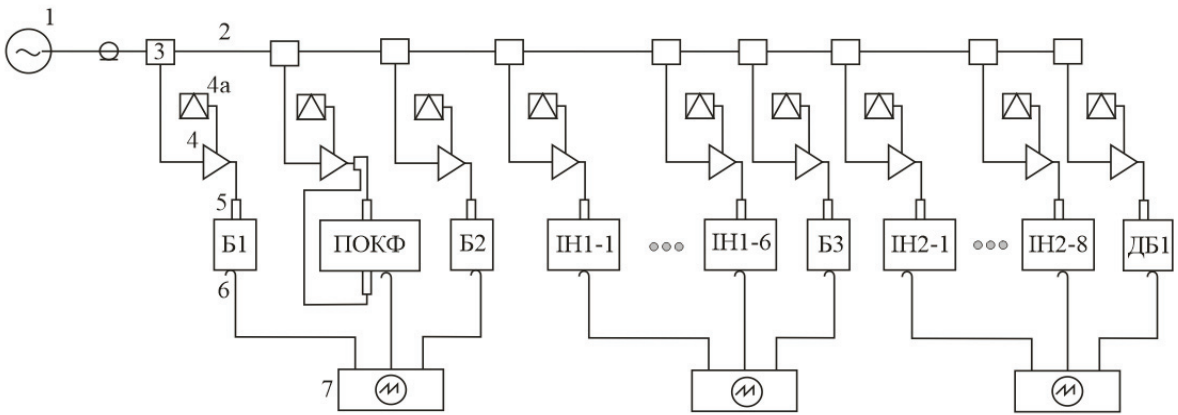






RF power system
total necessary power (Σ≈2300 kW)

Cavity	RFQ	Bunchers	Debuncher	IH-1	IH-2
Pulse power, kW	2x200	< 50	150	50	150
Number of cavities	1	3	1	6	8
Power, kW	400	150	150	300	1200



Solid state amplifiers (NIITFA)

Posters:

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Thank You for attention !