



Historical overview



Moscow Mechanical Institute was founded in 1942.

The main purpose of foundation – training of researchers and engineers for USSR nuclear program.

Since 1953 - **Moscow Engineering Physics Institute.**

Since 2008 - **National Research Nuclear University (Moscow Engineering Physics Institute)**, the first research university in Russia



Department of Electrophysical Facilities

was founded in 1948.

The Department trains specialists in charged particles beam physics and accelerator engineering.

More than 2500 persons were graduated by the Department.

Now, the Graduates are employed at all accelerator centers and laboratories of Russia, USA, Germany, Swiss, Japan, France, Canada and other countries.

More than 40 compact electron and proton accelerators were developed and manufactured for Russian research centers.

The Department has a broad experience in R&D of linear accelerators, accelerators theory, simulation of high intensity beam dynamics, RF and microwave electronics, vacuum technology, high-power pulsed and RF engineering.



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Possible impact to FCC project

1. Beam dynamics simulation in FCC e^-/e^+ booster.
2. RF systems R&D.
3. e^-/e^+ pre-injector linac R&D and production.
4. Involving of under-graduate and post-graduate students into project activities.



Beam dynamics simulation in FCC e-/e+ booster

We are in contact with Prof. Senichev (FZJ) about our possible participation in booster design. As we understand, FZJ takes the general design of booster ring including ramps and supervising of work in general. Our beam dynamics Lab. (S. Polozov with team) can do the routine beam dynamics simulation and study the nonlinear effects (chamber impedance, coulomb fields, beam loading in accelerating sections etc.) both by simulation and theory. Our RF Lab. (N.P. Sobenin and M. Lalayan with team) can take part in accelerating sections and overall RF system design. Beam dynamics simulations is planning to do using one of the standard codes (as ORBITA by ORNL), but we can to insert our self-designed blocks of Coulomb and beam loading simulations if it will necessary.



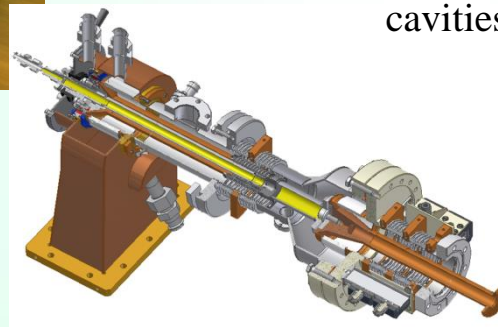
RF systems R&D.

RF lab team has an extensive competence in developing and testing of microwave power feeding systems.

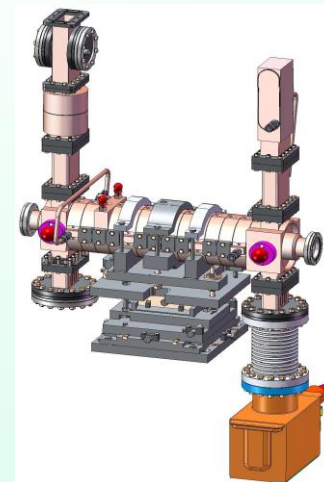
<http://rflab.jimdo.com/>



Adjustable directional couplers for TESLA
($C = 3 \dots 12$ dB; adj. range ± 1 dB; D, R better than 30 dB.)



High power input coupler for SC
cavities of Cornell ERL injector



DESY PITZ deflector system

Team is ready to respond for RF
components development:

simulation – design – low-power tests.



e-/e+ pre-injector linac R&D and production

MEPhI has the great and successful experience in field of research and industrial e-linacs design. More than 40 e-linacs was developed and manufactured at our Dept. of Electrophysical Facilities. As an example the new model of 10 MeV and 20 kW industrial linac design is finished in 2014, it was manufactured and under commissioning now. This linac is designed in cooperation with KORAD company (Saint-Peterburg) which is planning to do the high productivity sterilization complex using new linac.

We can to do all parts of e-linac design: general layout, e-gun design (but we can't to design a laser for photoguns), beam dynamics simulation, RF design (accelerating structure, RF feeding, couplers etc.), thermal studies, engineering design. We have very high accuracy code BEAMDULAC-BL designed for beam dynamics simulation taking into account Coulomb field and beam loading. We also have experience RF systems design both for conventional 16, 10, 5, 3 cm ranges and for exotic 17 and 27 GHz ranges. Our partner KORAD can help us with RF feeding system construction and we have the qualified manufacturer for linac structure.

Our RF lab. can to design the structure of deflector for beam measurement.

