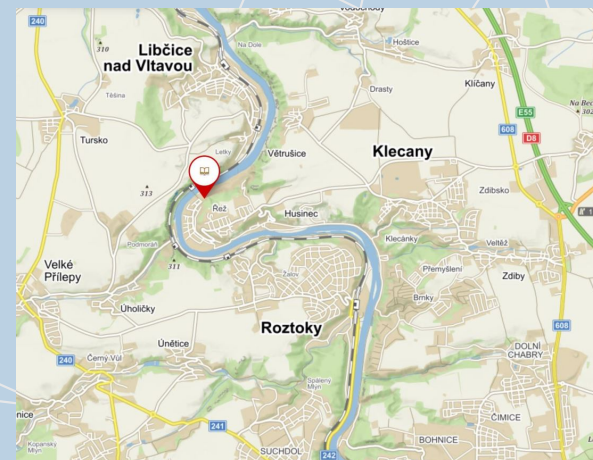


Contact

Nuclear Physics Institute
of the CAS
Husinec - Řež, čp. 130
250 68 Řež

Tel.: +420 220 941 147
E-mail: ujf@ujf.cas.cz
www.ujf.cas.cz



How to reach NPI

Bus:
Bus no. 371 from metro station "Kobylisy" (C line), go to final station "Husinec-Řež závod".

Train:
Station Masarykovo nádraží (near of metro station „Náměstí republiky“, B line) direction to Kralupy nad Vltavou (S4 line only!), get off on the station "Řež". For bus and train time schedules see website: www.idos.cz

Car:
From centre of Prague direction to town Teplice (highway D8), than use exit 1 (Zdiby, Klíčany). On the first cross turn right, go under highway straight on about 0,5 km than turn left and than go about 5 km to Řež.
GPS: 50°10.65485' N, 14°21.50460' E

Department of Radiation Dosimetry and CRL Radiocarbon Laboratory

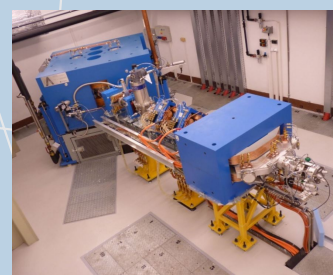
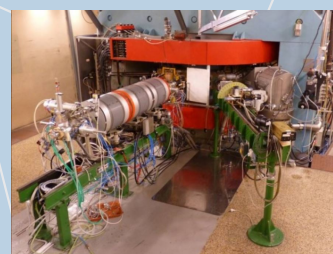
Public transport:

From the metro station „Nádraží Holešovice“ take bus No. 201 to the stop „Vychovatelna“. You will return approximately 50 m and continue on the left side along the street „Na Truhlářce“. You will find us in the second building on the left side of the street (an oblong building painted yellow).

GPS: 50°6'59.231 "N, 14°27'38.996" E

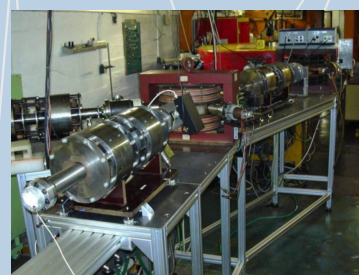
Main experimental facilities

U-120M isochronous cyclotron accelerator (for experiments and isotope production) and fast neutron generators connected to it.



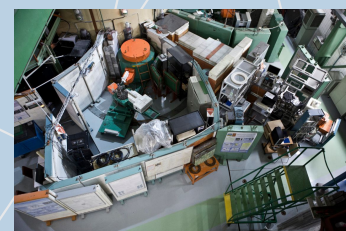
Cyclotron accelerator TR-24, installed in 2015 and producing an intense proton beam.

Tandem electrostatic accelerator Tandetron TN 4130 MC, installed in 2005 with devices for various analytical methods and used mainly for interdisciplinary and applied research.



Microtron MT-25, a cyclic accelerator of relativistic electrons with a possibility of conversion primary electron beam to secondary photon beam and neutrons.

Neutron diffraction and scattering equipment installed at the LVR-15 nuclear reactor - operated by the Řež Research Center (CVŘ) - used primarily for material research by means of ion beam analysis.



People

NPI employs around 300 people. It has got an international environment with many scientific visits, short- and long-term stays.

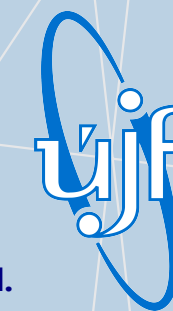


NPI is currently rejuvenating the age structure – one of the reasons is a successful postdoc support program. Two-thirds of NPI postdocs are from abroad, mainly from Italy and Slovakia, but citizens of other EU countries, Russia and other countries also works in the NPI. About 30 Ph.D. students and 15 university students are working on the thesis every year at NPI. Nearly 20 NPI scientists lead more than 30 semester courses at the universities every year. NPI is participating on the accreditations of selected doctoral studies branches of Charles University – Faculty of Mathematics and Physics, Faculty of Science, Czech Technical University in Prague – Faculty of Nuclear Sciences and Physical Engineering, Institute of Chemical Technology Prague – Faculty of Chemical Technology. NPI regularly invites high school and university students to the NPI labs, as well as the general public during Open Days.

Places

The NPI is located in a little village Řež, near Prague on the Vltava River bank. NPI has two separate workplaces in Prague too:
- Department of Radiation Dosimetry in the area of Bulovka Hospital
- Facility of the Microtron accelerator, located in one of the corridors inside the pedestrian tunnel (former bombshelter) connecting Prague's quarters Karlín and Žižkov.

Nuclear Physics Institute of the Czech Academy of Sciences



NPI of the CAS, public research institution, conducts research in a broad field of nuclear physics, experimental as well as theoretical.



The properties of nuclear matter under the heavy ion collisions at high and intermediate energies, nuclear reactions important for astrophysics or power plants, beta decays of atomic nuclei including the problem of neutrino masses are especially studied in the NPI. The nuclear theory is oriented to nuclear structure, hypernuclei, interactions of elementary particles with nuclei, or mesonic degrees of freedom in nuclei.

NPI uses neutron scattering, mainly in the solid state physics and material research. A large complex of nuclear analytical methods based on charged particles and neutrons beams is used in the interdisciplinary research in collaboration with external specialists in chemistry, ecology, medicine, archaeology etc.

The dosimetry of ionizing radiation is oriented to the measurements of environmental and professional exposures, metrology, and biophysical aspects as DNA radiation damages. The research and development of radiopharmaceuticals, especially short lived positron emitters for the positron emission tomography (PET), is performed at the NPI, as well as physics for perspective methods of nuclear energetics like accelerator driven transmutation of nuclear waste.

Departments of the NPI



Apart from Director's Office and Technical and Economic Administration (building on the photo), NPI has seven scientific departments.

Department of Theoretical Physics

Theoretical research in nuclear, particle and mathematical physics (the last one as a part of Doppler Institute for Mathematical Physics and Applied Mathematics), organization of the international conferences, giving lectures at Czech universities.

Department of Nuclear Spectroscopy

It examines the properties of nuclear matter under extreme conditions, studies relativistic and ultra-relativistic heavy ion collisions, works on neutrino mass determination, studies weak interaction in b-decay and develops nuclear analytical methods, especially neutron activation analysis.

Department of Nuclear Reactions

Performs fundamental research in nuclear astrophysics and physics of exotic nuclei, fundamental and applied research with fast neutron generators and activation with charged particles. It collaborates with SPIRAL2/Ganil and other international infrastructures.

Department of Neutron Physics

It carries out fundamental and applied research with thermal neutrons at the horizontal channels of LVR-15 reactor and develops nuclear analytical methods with charged particles at the Tandetron 4130 MC accelerator. Neutron Physics Laboratory (NPL) is part of the CANAM infrastructure.

Department of Accelerators

It ensures the operation of accelerators - cyclotrons U-120M and TR-24, and Microtron MT-25. Development and design of target systems for different types of experiments. Simulation of dynamic parameters of the beams during acceleration and extraction processes.

Department of Radiation Dosimetry

Research on cosmic radiation on Earth, on board of aircrafts and spacecrafts, studies of radionuclides in the environment, anthropogenic effects in the nature, radiocarbon dating (CRL Laboratory), biological effects of ionizing radiation at molecular and cellular level, dosimetry and microdosimetry.

Department of Radiopharmaceuticals

It develops novel medical radionuclides and studies cyclotron production of ^{99m}Tc labelling of monoclonal antibodies and their fragments, develops of microfluidic systems for automated labelling and measures of excitation functions of nuclear reactions on cyclotron U-120M.

History

In 1955, the Nuclear Physics Institute was founded at Řež as a basic Czechoslovak institution in the nuclear fields.

Lately, it was renamed as the Nuclear Research Institute. In 1972, the institute was separated into two main parts. The largest part, devoted mainly to the applied research, was subsidised to the Czechoslovak Commission for Atomic Energy under the same name and lately, in 1992, privatized (its contemporary name is ÚJV Řež).



The second largest part, devoted mainly to the basic research, remains a part of the Czechoslovak Academy of Sciences under the name Nuclear Physics Institute. In 1979, the Low-temperature Department passed from NPI to the Institute of Physics. In 1993, after division of former Czechoslovakia, NPI became one of the institutes of Czech Academy of Sciences (CAS). Former Institute of Radiation Dosimetry of the CAS, in Prague, was connected to the NPI as a detached branch in 1994, as Department of Radiation Dosimetry. The Laboratory of Neutron Activation Analysis passed from Czech Environmental Institute to the NPI in the same year.



Former Van de Graaff accelerator, now part of National Technical Museum in Prague

Since 2007, the NPI is a public research institution. The radiopharmaceuticals production was transferred to the company RadioMedic Ltd. in 2009, NPI being its only holder. New cyclotron TR-24 was installed in 2015. In 2018, new radiochemical laboratories with pipeline mail were added, especially for the preparation of radionuclides from the cyclotron TR-24, located below the laboratories. New laboratory with AMS accelerator Milea under RAMSES project started building from 2019.

International cooperation and projects

The NPI has a many international collaborations in the most field of its activities, like e.g. theoretical and mathematical physics, neutron physics, nuclear analytical methods, or radiation dosimetry.

NPI physicists participate in the large experiments like STAR in BNL (USA), ALICE LHC project in CERN (Switzerland) or neutrino experiment KATRIN in Karlsruhe (Germany). On the other hand, some NPI local experimental facilities are required and used by our foreign partners.



Cyclotron U-120M serves for the measurement of astrophysically important nuclear reactions (collaboration Řež-Texas-Catania). Rather unique generator of fast neutrons installed at the cyclotron is used for the measurement of neutron activation cross sections required for perspective nuclear energetics (e.g. for projects IFMIF and ITER). Neutron Physics Laboratory is a partner in european research project SINE2020 (Science and Innovation with Neutrons in Europe in 2020) in the framework programme HORIZON 2020.

Since 2016, the NPI has received funding for several major projects from the EU Structural Funds (operational programme Research, Development and Education):

Center of Accelerators and Nuclear Analytical Methods (CANAM)

One of the large European research infrastructures (LRI) comprises 3 major research laboratories:

- Laboratory of Cyclotrons and Fast Neutron Generators (LC&FNG), operating U-120M and TR-24
- Laboratory of Tandetron (LT) operating accelerator Tandetron 4130 MC
- Neutron Physics Laboratory (NPL) providing facilities at the reactor LVR-15. Reg. No. CZ.02.1.01/0.0/0.0/16_013/0001812

ESS Scandinavia-CZ

The European Spallation Source (ESS), builded in Lund (Sweden), will be the world's most powerful neutron source. Czech 2% membership in the ESS is mostly in the form of in-kind contributions. Roughly half of this will be realized in the form of design, construction and installation of the diffractometer BEER (Beamline for European material Engineering Research). The second half of the Czech contribution will be realized in the form of in-kind delivery of technological units related to the cooling of the neutron target system. Reg. No. CZ.02.1.01/0.0/0.0/16_013/0001794



EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research,
Development and Education



MINISTRY OF EDUCATION,
YOUTH AND SPORTS



EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research,
Development and Education



MINISTRY OF EDUCATION,
YOUTH AND SPORTS

FAIR-CZ

Facility for Antiproton and Ion Research (FAIR) GmbH is a newly constructed European large research infrastructure, built at the German national laboratory at GSI Darmstadt. Czech research infrastructure FAIR-CZ included in-kind contributions to FAIR construction. It consist of purchase of key equipment for the ECAL detector of HADES, for the PSD detector of CBM spectrometer, and for the Electromagnetic PbWO calorimeter of PANDA spectrometer. Collaboration is deeper now: Czech Republic, represented by the NPI, became first Aspirant Partner of FAIR (new kind of participation) in March 2019. Reg. No. CZ.02.1.01/0.0/0.0/16_013/0001677

SPIRAL2-CZ

SPIRAL2 will be a part of GANIL (Le Grand Accélérateur National d'Ions Lourds) in Caen, France, an extension of this large research infrastructure. SPIRAL2 will accelerate exotic nuclei and deliver radioactive ion beams. The Czech in kind contribution to construction of SPIRAL2 are investments into the production target R-OBOT (Řež - Other Beams Other Targets), targets for the research of radioisotopes, HPGe detector, and detection system for the irradiation chamber. Reg. No. CZ.02.1.01/0.0/0.0/16_013/0001679

RAMSES

Ultra-trace isotope research in social and environmental studies using accelerator mass spectrometry. Establishment of the first AMS laboratory in the Czech Republic - extension of the CANAM infrastructure in reconstructed administrative building of the former Van de Graaff accelerator on the premises of NPI of the CAS in Řež. New Milea AMS accelerator will be part of it. Reg. No. CZ.02.1.01/0.0/0.0/16_019/0000728

CRREAT

Research Center of Cosmic Rays and Radiation Events in the Atmosphere (CRREAT) will address so far unanswered questions of detection and dosimetry of ionising radiation both of cosmic and terrestrial origin. Reg. No. CZ.02.1.01/0.0/0.0/15_003/0000481

KINEÓ

Physicists on the move (KINEÓ) project support the mobility of young researchers. Reg. No. CZ.02.2.69/0.0/0.0/16_027/0008491



Experimental chamber of astrophysics