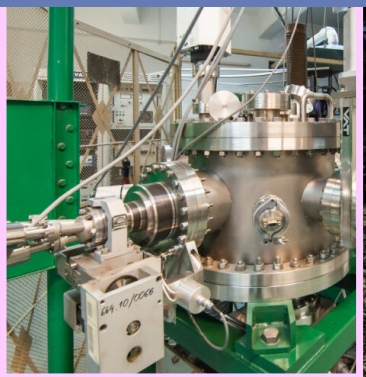
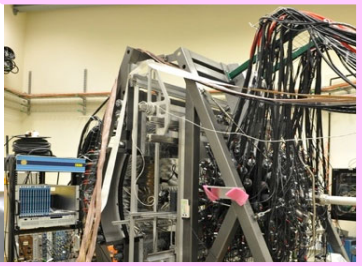
The Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Sciences (IFJ PAN)





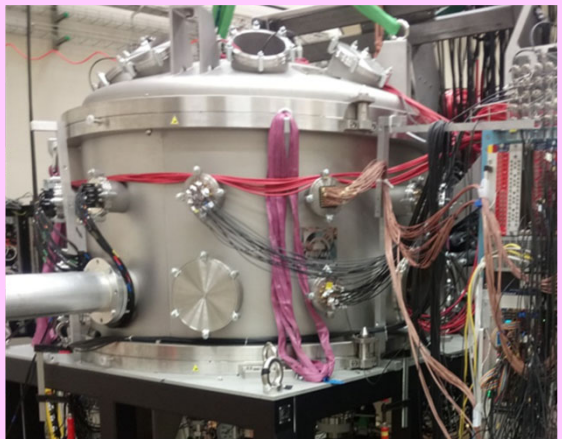


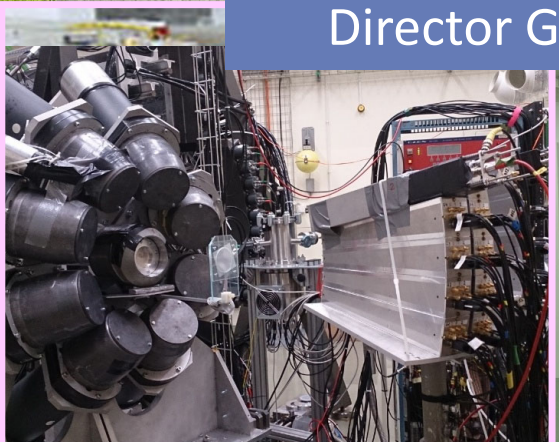


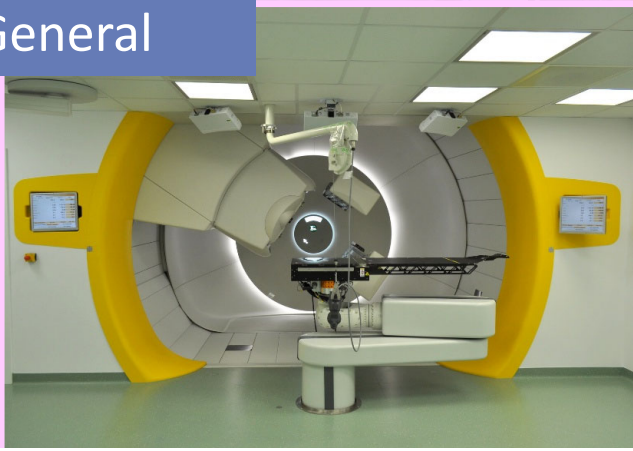


Prof. Tadeusz Lesiak
Director General



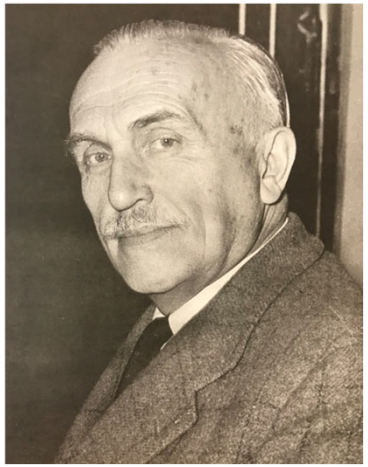




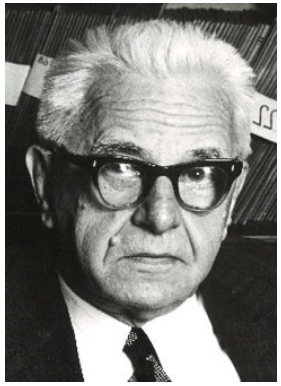


Genesis and History

1955 – founding of IFJ as the institute where the first cyclotron in Poland was located.



Prof. Henryk Niewodniczański (1900-1968)



Prof. Marian Mięsowicz (1907-1992)

1970 – Particle physics joins

2003 – IFJ receives the status of a research institute of the Polish Academy of Sciences - **IFJ PAN**

70 LAT INSTYTUTU FIZYKI JĄDROWEJ IM. HENRYKA NIEWODNICZAŃSKIEGO PAN 1955 – 2025

2025 – 70 years of IFJ PAN

General Information

✓ **Personnel:**

- Total 603
- professors 34
- associate professors 59
- senior researchers + postdocs 94
- engineers 117

✓ **Status:**

highest category among research institutions in Poland A+

Instytut kategorii A+

EU distinction of "HR Excellence in Research"

HR EXCELLENCE IN RESEARCH

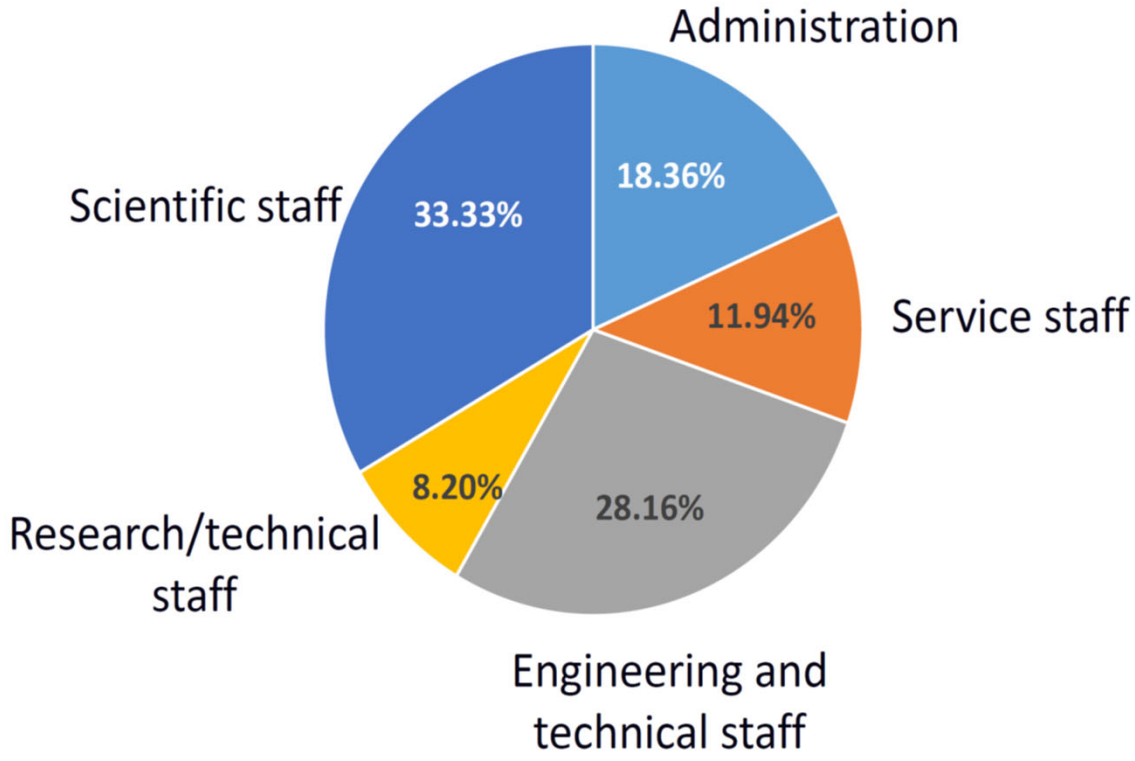
World University Rankings 2026
Discover the world's top 2000 universities

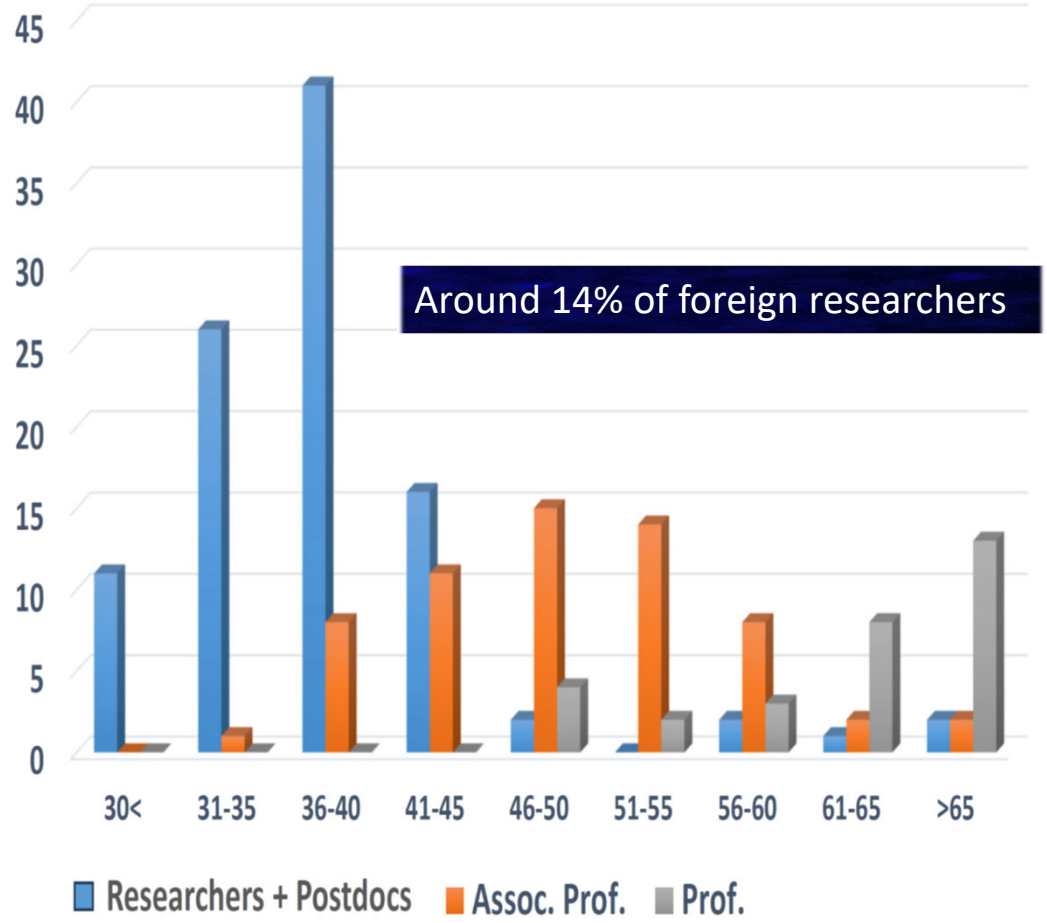
CWUR

Rank 807
(Top 3.8%)

✓ **Scientific output: > 650 JRC publications annually**

Employment structure

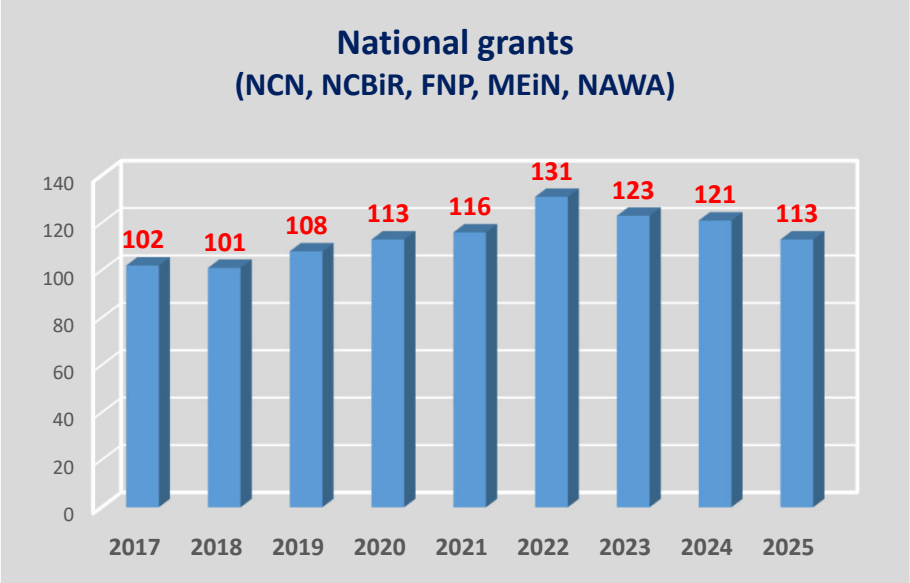


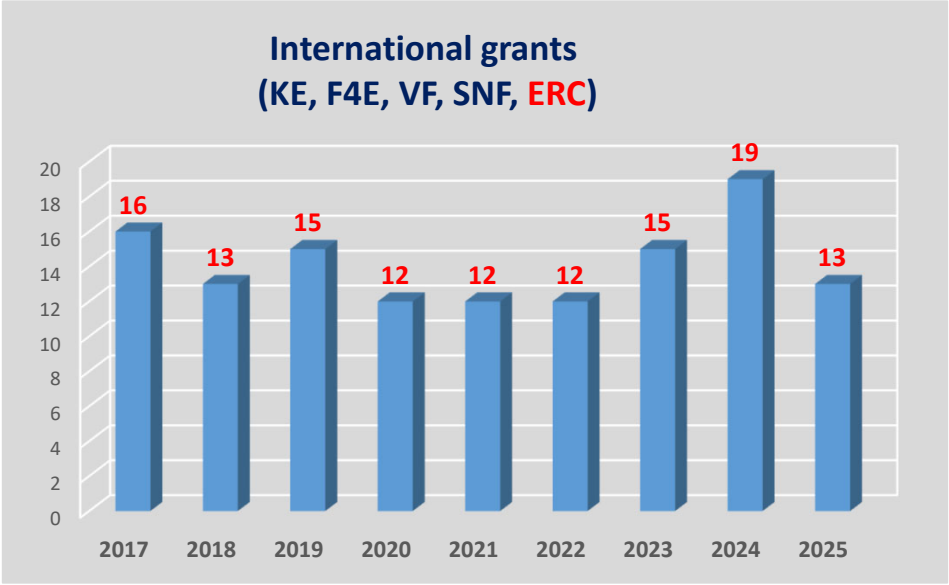


Around 14% of foreign researchers

Around 30 new postdoc positions annually

International and Polish grants implemented at IFJ PAN





IFJ PAN on Polish Roadmap for Scientific Infrastructure

Projects coordinated by the IFJ PAN

1. CCB – Cyclotron Center Bronowice (development, next phase)
2. Centrum of Engineering of Cryogenic Materials
3. ESS – European Spallation Source
4. SPIRAL2
5. Research in particle physics at CERN
6. Polish contribution to DEMO-Oriented Neutron Source (IFMIF-DONES)

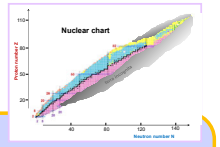
Projects with IFJ PAN as a partner, correlated with the national contribution to ESFRI:

1. E-XFEL – Free Electron Laser
2. ELI – Extreme Light Infrastructure
3. CTA – Cherenkov Telescope Array
4. FAIR – Facility for Antiproton and Ion Research
5. ESRF – European Synchrotron Radiation Facility
6. RAPID Center for Radiation Research and Technology
7. Hyper-Kamiokande
8. POULARIS – Poland's Underground Laboratory

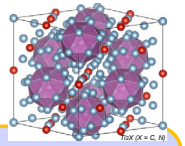
Organizational structure



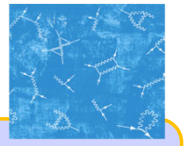
Division of Particle and Astroparticle Physics



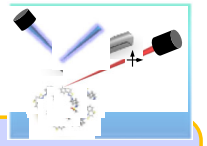
Division of Nuclear Physics and Strong Interactions



Division of Condensed Matter Physics



Division of Theoretical Physics



Division of Interdisciplinary Research



Division of Applications of Physics



Cyclotron Center Bronowice



Division of Scientific Equipment and Infrastructure Construction



4 Accredited Laboratories

Krakow School of Interdisciplinary PhD Studies



Staff: 56 + PhD students 21

Major research topics:

- **The ATLAS experiment at LHC CERN**
- **The LHCb experiment at LHC CERN**
- **The Belle II experiment (KEK, Tsukuba, Japan)**
- **Cosmic Ray Research (PierreAuger, CREDO)**
- **Neutrino studies (T2K, P-ONE)**
- **High energy Gamma-Ray Astrophysics (HESS, HAWC, CTA)**
- **Involvement in other projects**
  - MUonE experiment at CERN
  - ATHENA experiment at future EIC
  - Physics feasibility studies for FCC
  - development of “Clould Computing” and GRID computing infrastructures



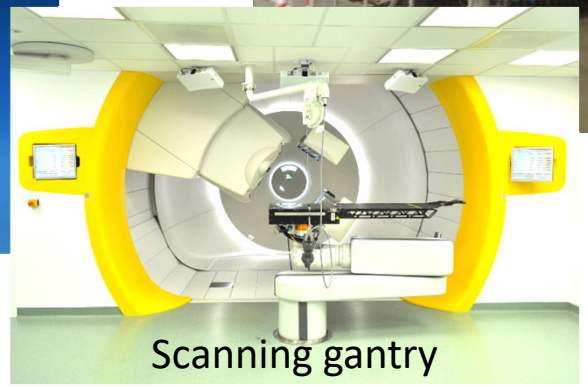
Cyclotron Centre Bronowice

Staff: 59 + PhD Students 1



Proton cancer therapy

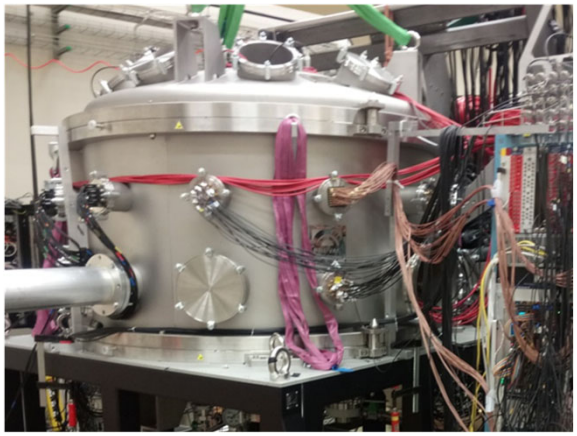




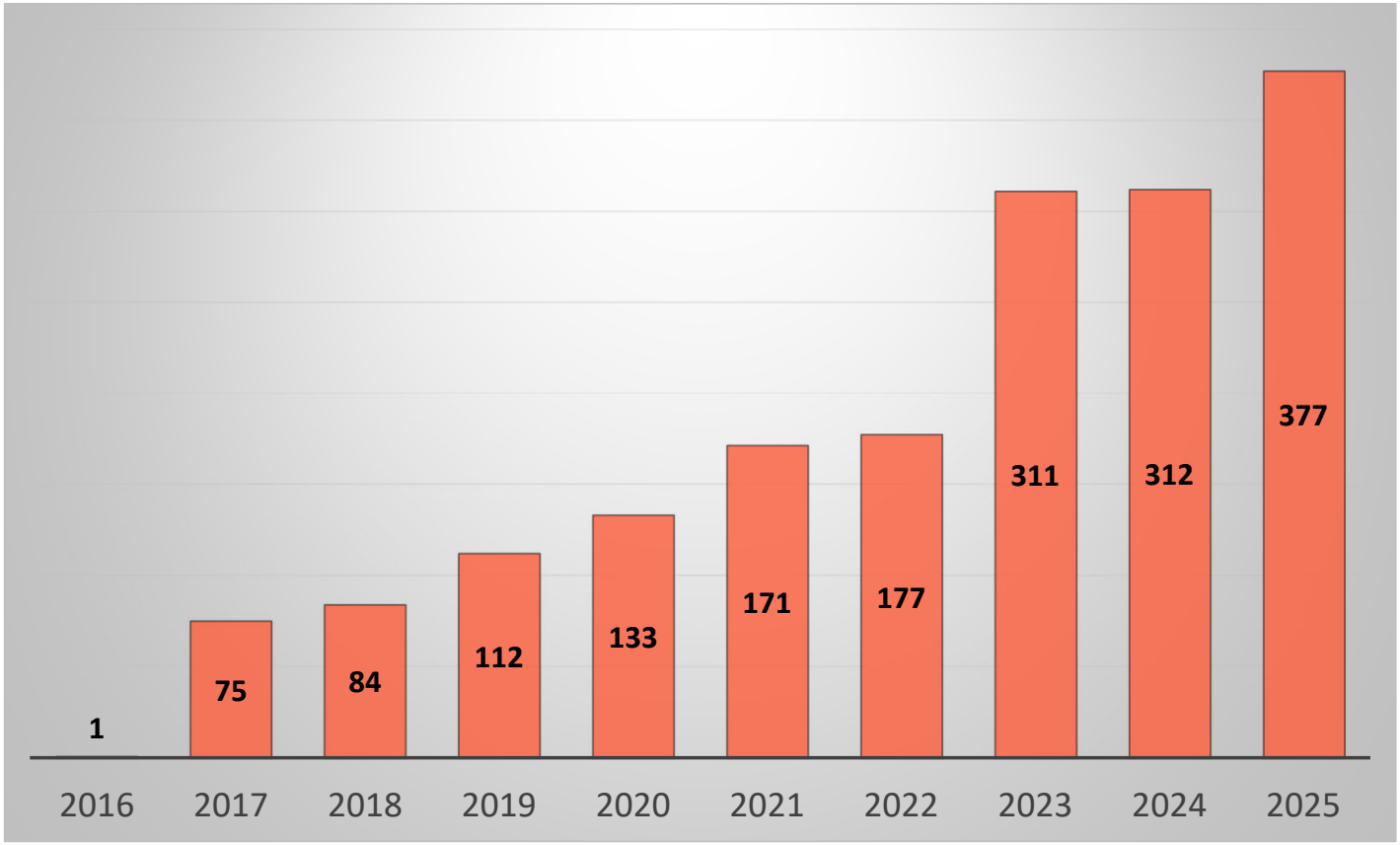


proton beam
70-230 MeV

Fundamental research
in nuclear physics



Number of patients irradiated in gantries by year



Division of Scientific Equipment and Infrastructure Construction

Staff: specialists/engineers/technicians: **38**
PhD/assoc. prof.: **5**

Constructions of large external research infrastructures and construction of local research base
(cryogenics, vacuum, precise mechanics, quality aspects, test of magnets, RF systems installations and tests,…)

Last decade engagements: 536 FTE (person-years)

Experience examples	FTE
E-XFEL – DESY, Hamburg, Niemcy	~165
ITER – Cadarache, France	~15
LHC – Long Shutdown 2	~47
European Spallation Source (ESS) – Lund, Sweden	~130



SIS100 (GSI-FAIR)

Present activities

- **Installation of SIS100 (GSI-FAIR)**
  - Tests for ITER
  - ESS: SRF and cryogenics support
  - Contribution to LHC
  - SSD detector for Pierre Auger
- **Local infrastructure: test stand for S.C. wires and magnets**



IFJ PAN

Krakow School of Interdisciplinary PhD Studies (KISD)

The Krakow School of Interdisciplinary PhD Studies consists of:

KISD
KRAKOWSKA INTERDYSCYPLINARNA SZKOŁA DOKTORSKA

1. The Henryk Niewodniczański Institute of Nuclear Physics PAN - COORDINATOR
2. Jerzy Haber Institute of Catalysis and Surface Chemistry PAN
3. Jerzy Maj Institute of Pharmacology PAN
4. Mineral and Energy Economy Research Institute PAN
5. Strata Mechanics Research Institute PAN
6. Institute of Metallurgy and Materials Science PAN
7. Faculty of Materials Science and Ceramics AGH
8. Faculty of Physics and Applied Computer Science AGH
9. Faculty of Energy and Fuels AGH University of Science and Technology (WEiP AGH)
10. Faculty of Environmental Engineering and Energy Cracow University of Technology (WIŚiE PK)
11. Faculty of Civil Engineering Cracow University of Technology (WIL PK)



At IFJ PAN, the KISD PhD students are involved in research in the following areas:

- Particle physics and astrophysics
- Nuclear physics and strong interactions
- Solid state physics
- Interdisciplinary research:
- Medical physics
- Physics in biological systems,
- Radiation protection,
- New energy sources.

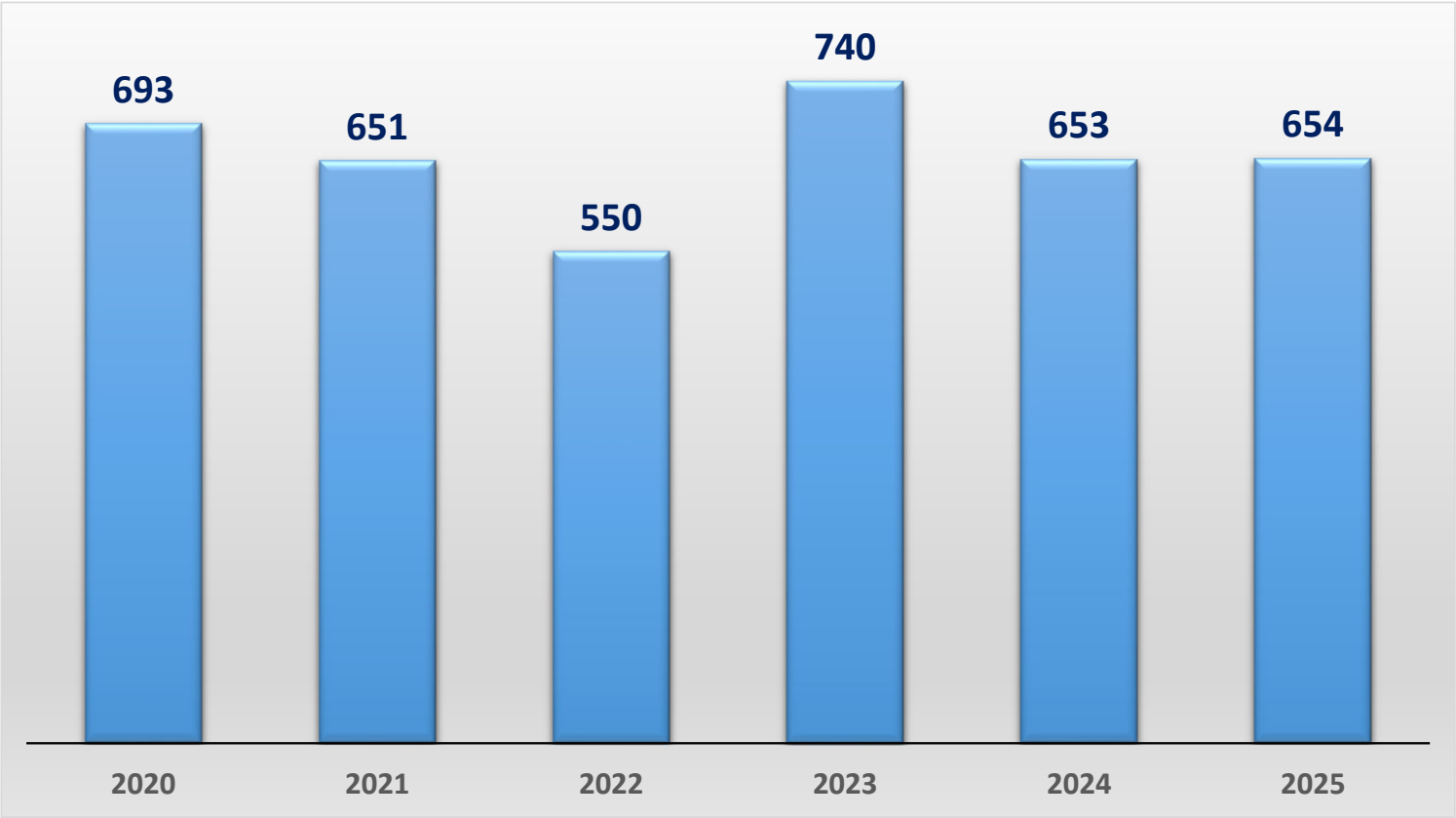
The whole School: 109 students (29 foreigners)

at IFJ PAN: 48 students (20 foreigners)

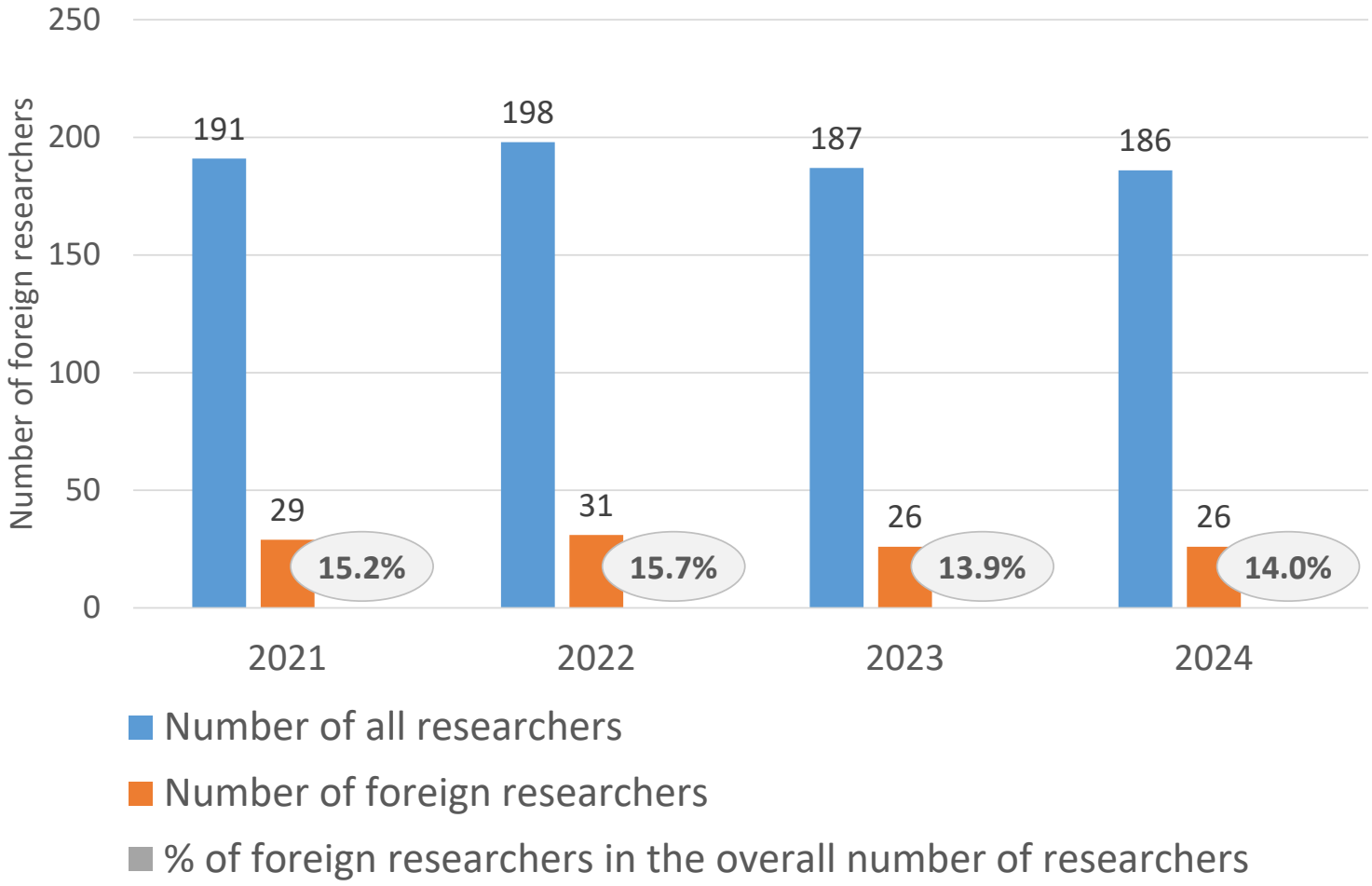
Around 20 new PhD students annually

Thank you for your attention

Scientific Publications in JRC Journals



Foreign researchers

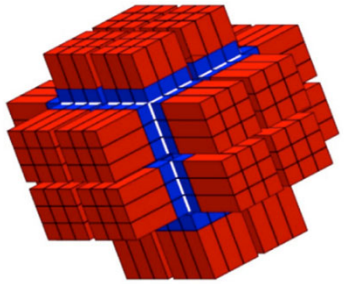


Staff: 38 + PhD Students 6

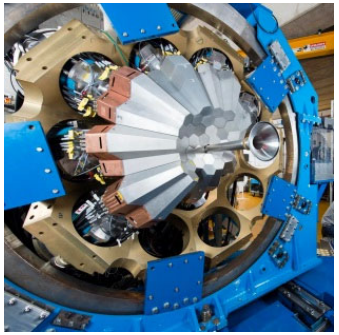
Major research areas:

- Nuclear structure in function of temperature, spin and isospin
- Nuclear reactions mechanisms and hadron collisions
- Interactions of relativistic ions
- Theoretical studies of the structure and dynamics of many-body nuclear and hadron systems
- Research and development of new detection techniques for nuclear physics

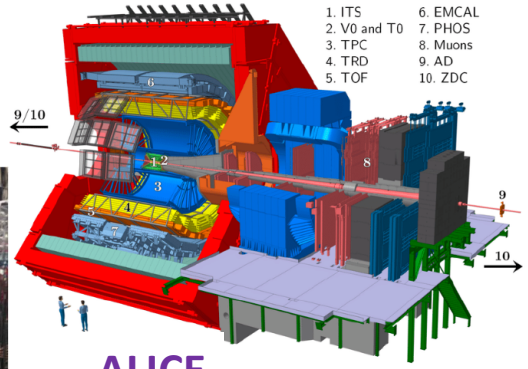
International collaborations with, e.g., France, Italy, Germany, CERN



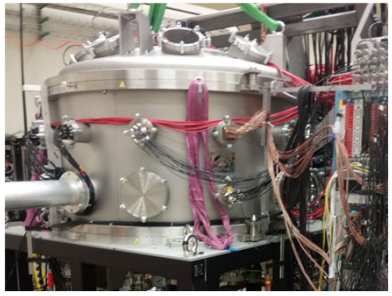
PARIS



AGATA

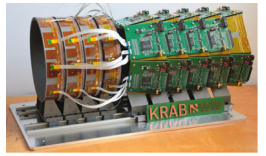


ALICE



scattering chamber at CCB

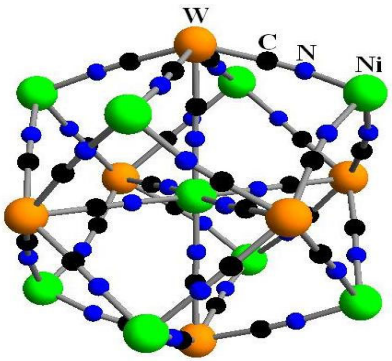
KRAB detector



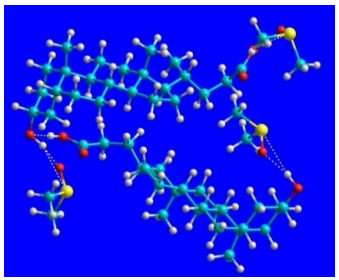
Division of Condensed Matter Physics

Staff: 51 + PhD Students 9

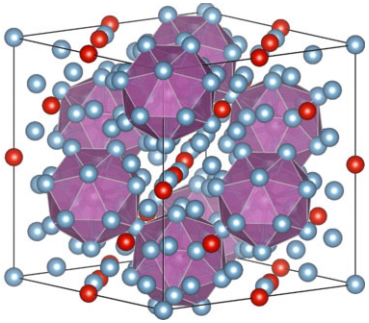
Classical and molecular magnetism



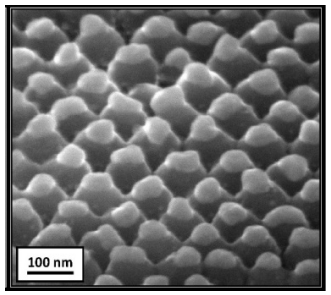
Soft matter



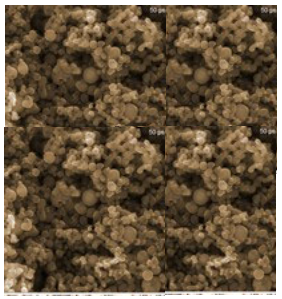
Superconducting materials



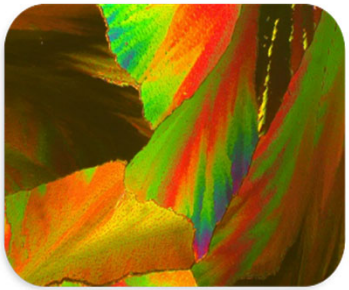
Low-dimensional systems



Molecular materials and nanomaterials

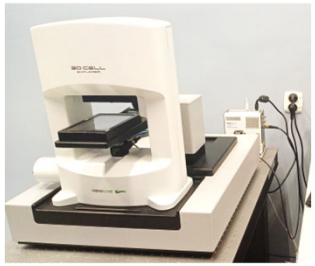


Liquid crystals





SQUID Magnetometer



Holotomographic microscope



Infrared spectrometer

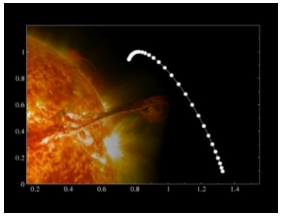


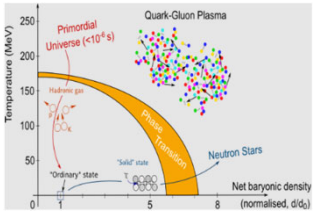
Scanning electron microscope

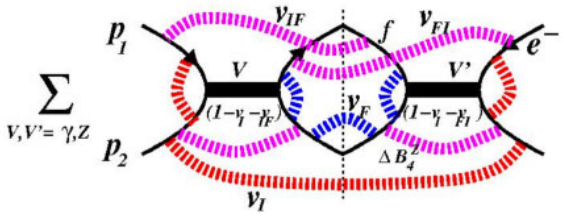
Staff: 19 + PhD Students 7

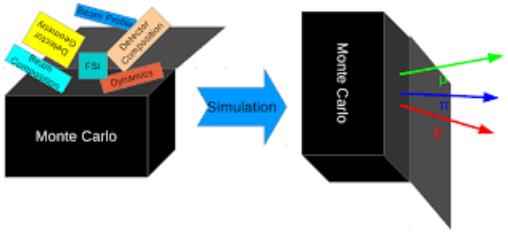
Major research topics:

- particle theory
- theory of structure of matter
- theory of complex systems
- mathematical physics









Staff: 29 + PhD Students 3

STUDIES OF **BIOLOGICAL STRUCTURES** USING:

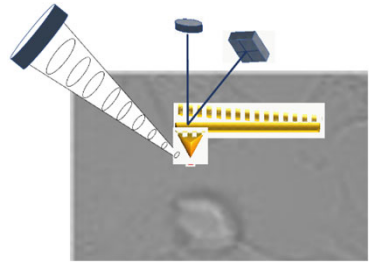
- vibrational micro- and nanospectroscopy
- atomic force microscopy
- X-ray spectroscopy at free-electron-laser facilities
- Nuclear Magnetic Resonance tomography



AFM-IR „NanoIR”



Raman Spectrometer



AFM-IR technique



Atomic Force Microscope (AFM)



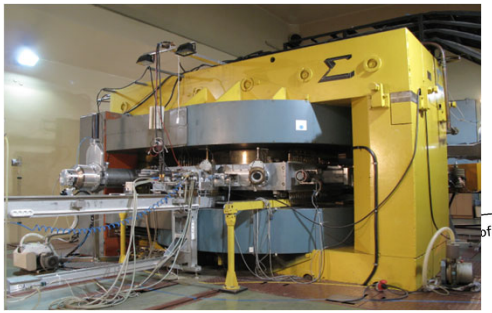
9.4 T NMR system

Division of Applications of Physics (NO6)

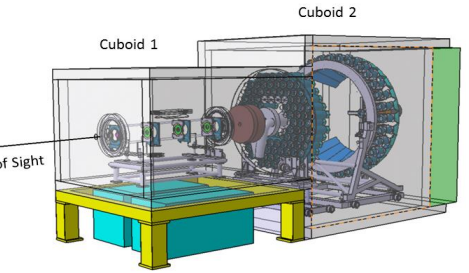
Staff: 57 + PhD Students 6

Major research topics:

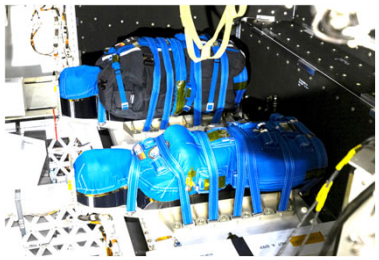
- neutron and ion diagnostics for fusion reactors
- medical physics for proton therapy
- space dosimetry, thermo- and optically stimulated luminescence, retrospective dosimetry
- low-level radioactivity measurements in environment: α, β, γ spectroscopy
- mass spectrometry (Arctic, glaciers, etc.)



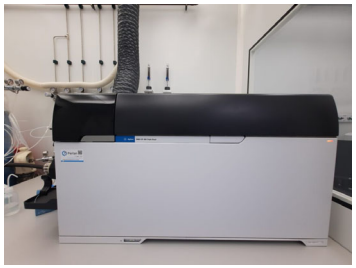
Cyclotron AIC-144



HRNS (High Resolution Neutron Spectrometer) for ITER



Studies of cosmic rays exposition of astronauts (on the Moon's orbit)



Mass spectrometer ICP-MS/MS

Accredited Laboratories

Laboratory of Individual and Environmental Dosimetry

- Measurements of individual and environmental doses by thermoluminescence method
  - **250 000** measurements in 2025
  - **11 000** institutions in Poland and Europe
  - **50 000** radiation workers/measurement points under dosimetric supervision







Laboratory of Calibration of Radiation Protection Instruments

- Calibration of up to **1400** survey meters (γ-rays, α, β surface emission)

Laboratory of Radiometric Expertise

- **~1000** measurements and expert opinions for external customers (materials, terrains, buildings, soil, water etc, …)

Laboratory of Radioactivity Analyses

- **~60** commercial measurements of concentration of ^{40}K, ^{228}Th, ^{226}Ra, ^{238}, $^{239+240}Pu$, $^{134,137}Cs$, ^{99}Tc, ^{131}I, ….
- Member of the expert network “ALMERA” of the Intern. Atomic Energy Agency (IAEA)

Outreach Activities – Promotion and Education in Science



Małopolska Researchers' Night



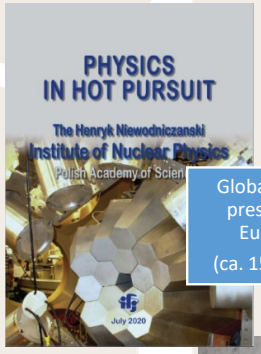
"Physics Couch" discussion series



Shows "Fascinating Physics" for children and teenagers



Musical spectacle "At the intersection of two infinities"



Global scientific press service: EurekAlert (ca. 15 per year)

Festival of Science and Art in Krakow

Scientific Picnic of the Polish Radio and Copernicus Science Centre

Scientific Picnic of the Polish Academy of Sciences

Visits of high school students to laboratories at IFJ PAN

IFJ PAN Open Day for students

Małopolski Festival of Innovation

QuickPhysX and QuizFiz contests

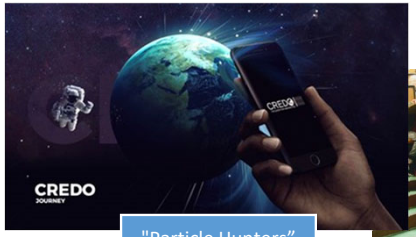
Silesian Science Festival in Katowice

Particle Physics Summer Student Program at IFJ PAN

Int. Masterclasses - Hands on Particle Physics for high school students

Making popular science movies on research carried out at IFJ PAN

Activity in social media: Facebook, Twitter and YouTube



"Particle Hunters" contest with the CREDO Detector application





Children's Day at IFJ PAN