

Department of Fundamental Research (DBP) in 2023

Structure

Nuclear Physics Division (BP1)

head - prof. dr. hab. Zygmunt Patyk

*nuclear structure and nuclear reactions
at low and intermediate energies*

Theoretical Physics Division (BP2)

head - dr. hab. Michał Kowal

*nuclear physics from low to high energies,
physics of elementary particles,
QCD, field theory, astrophysics, cosmology,
classical and quantum gravity*

High Energy Physics Division (BP3)

head - dr. hab. Justyna Łagoda

*experimental elementary particle physics
and experimental high-energy nuclear physics*

Astrophysics Division (BP4)

head – dr. hab. Katarzyna Małek

*observational cosmology and astrophysics,
experimental cosmic ray physics*

Employee of DBP

| | DBP 2022 | | DBP 2023 | |
|----------------------------------|----------|------|----------|------|
| | people | jobs | people | jobs |
| prof. & dr. hab. | 35 (10) | 27.8 | 37 (12) | 28.7 |
| dr | 52(3) | 49.9 | 47 (2) | 46 |
| mgr | 2 | 1.1 | 2 (1) | 1.1 |
| administration & technical stuff | 8 | 8 | 4 | 4 |
| all | 97 (14) | 86.8 | 90 (14) | 79.8 |

| 2023 | BP1 | | BP2 | | BP3 | | BP4 | |
|----------------------------------|--------|------|--------|------|--------|------|--------|------|
| | people | jobs | people | jobs | people | jobs | people | jobs |
| prof. & dr. hab. | 3 | 3 | 17 (6) | 13.5 | 11 (5) | 7 | 5 (1) | 4.2 |
| dr | 2 | 2 | 17 (1) | 16.5 | 15 (1) | 14.5 | 13 | 13 |
| mgr | 0 | 0 | 0 | 0 | 0 | 0 | 2 (1) | 1.1 |
| administration & technical stuff | 1 | 1 | 0 | 0 | 0 | 0 | 3 | 3 |
| all | 6 | 6 | 34 (7) | 30 | 26 (6) | 21.5 | 20 (1) | 18.3 |

39 Ph.D. students in 2022

31 Ph.D. students in 2023

* in brackets number of retired employees

Prof. Ryszard Sosnowski passed away

- Pioneer of particle physics in Poland
- Member of Polish Academy of Sciences and Polish Academy of Art and Sciences
- Recipient of Smoluchowski Medal of Polish Physical Society
- Coauthor of the first Polish textbook on particle physics



Ryszard Sosnowski (1932 - 2023)

Promotions

2022

Doctorates: **4**
Habitations: **1**
Professorships: **0**

2023

Doctorates: **7**
Habitations: **1**
Professorships: **1**

Doctorates: Paritosh Verma, Kamil Skwarczyński, Mahmoud Hamed, Gabriele Riccio, Arantxa Tymowska, Jaime de Cabo Martin, Francesco Pistis

Habitations: Andrzej Hryczuk

Profesorships: Janusz Skalski

Research grants

2022

all grants: **54**

grants of NCN: **36**

MNiSW : **4**

UE, NCBiR, NAWA, others: **14**

2023

all grants: **66**

grants of NCN: **36**

MNiSW : **28**

UE, NCBiR, NAWA , others : **28**

Publications

2022

Peer-reviewed publications: **412**

BP1: **14** (6 together with BP2, BP3)

BP2: **151** (74 together with BP3)

BP3: **234** (72 together with BP1, BP2 or BP4)

BP4: **89**

2023

Peer-reviewed publications: **457**

BP1: **12** (4 together with BP2 or BP3)

BP2: **135** (73 together with BP1 or BP3)

BP3: **318** (73 together with BP1 or BP2)

BP4: **65**

Main fields of research

Experimental physics

- High-energy particle physics – experiments CMS & LHCb, 14*
- Neutrino physics – experiments T2K, SK, km3net, Hyper-K, 10
- High-energy nuclear physics – experiments ALICE, NA61/SHINE, 5
- High-energy lepton-hadron interactions – experiment COMPASS, 3
- Hadron physics – experiments KLOE-2, 5
- Observational cosmology – projects VIPERS, VVDS, AKARI, Planck, 8
- Observational astrophysics – LIGO-Virgo, 5
- Cosmic ray physics – experiments JEM-EUSO, 1
- Nuclear structure – experiments @ GSI and @ U200, 4
- Nuclear reactions at low and intermediate energies, 5

* approximate number of physicists involved

Main fields of research cont.

Theoretical physics

- Structure and dynamics of atomic nuclei (superheavy and exotic), 4*
- Interactions and structure of hadrons, QCD, 10
- Cosmological models, classical and quantum gravity, 8
- Physics beyond Standard Model and dark matter, 9
- String theory, 2
- Ultra-cold atomic gases, 2

* approximate number of physicists involved

Presentations of main research achievements of 2023

| presentation | speaker |
|--|-----------------------|
| <i>Antiproton - a tool for nuclear studies</i> | Sławomir Wycech |
| <i>Probing an ultrarelativistic heavy ion at next-to-eikonal accuracy</i> | Alina Czajka |
| <i>Manifestation of relative phase in dynamics of two interacting Bose-Bose droplets</i> | Maciej Pylak |
| <i>New insights on neutrino-DM interactions from CMB observations</i> | Sebastian Trojanowski |
| <i>Challenges in the synthesis of new elements</i> | Tomasz Cap |
| <i>Exotic long-lived particles in CMS at LHC</i> | Małgorzata Kazana |
| <i>Probing the nucleon structure with processes of exclusive meson production in muon-proton scattering at COMPASS</i> | Andrzej Sandacz |
| <i>Tau neutrino appearance in Super-Kamiokande</i> | Justyna Łągoda |
| <i>Determination of branching fraction $\eta \rightarrow \pi^0 \gamma \gamma$ with KLOE experiment</i> | Marcin Berłowski |
| <i>Do we see isospin symmetry breaking in ka on production in p+p and/or A+A collisions?</i> | Damian Pszczel |
| <i>Evolution of dusty quiescent galaxies over the last six billion years</i> | Ambra Nanni |
| <i>Shedding light on hidden stars in the early Universe</i> | Mahmoud Hamed |
| <i>Galaxy merger features looming in the background</i> | Luis Suelves |
| <i>Hunting for Red nuggets - untouched survivors of the early universe</i> | Krzysztof Lisiecki |