

# Department of Fundamental Research (DBP) in 2024

## Structure

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### **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

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	DBP 2023		DBP 2024	
	people	jobs	people	jobs
prof. & dr. hab.	37 (12)	28.7	43(11)	34.9
dr	47 (2)	46	41(1)	40.5
mgr	2 (1)	1.1	0	0
administration & technical stuff	4	4	4(1)	3.8
all	90 (14)	79.8	88(13)	79.2

2023	BP1		BP2		BP3		BP4	
	people	jobs	people	jobs	people	jobs	people	jobs
prof. & dr. hab.	3	3	19 (4)	16.2	12 (4)	8.9	8 (3)	5.8
dr	2	2	15	15	13 (1)	12.5	11	11
mgr	0	0	0	0	0	0	0	0
administration & technical stuff	0	0	0	0	0	0	0	0
all	5	5	34 (4)	31.2	25 (5)	21.4	19(3)	16.8

**31** Ph.D. students in 2023

**31** Ph.D. students in 2024

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\* in brackets number of retired employees

# Promotions

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**2023**

Doctorates: **7**

Habilitations: **1**

Professorships: **1**

**2024**

Doctorates: **6**

Habilitations: **3**

Professorships: **0**

Doctorates: Luis Eduardo Suelves Casaus, Hareesh Thuruthipilly, Nora Salone,  
Victor Martinez-Fernandez, Yashwanth Sanjeev Prabhu, Piotr Kalaczyński

Habilitations: Ambra Nanni, Orest Hrycyna, Paweł Sznajder

Profesorships:

## Research grants

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### 2023

all grants: **66**

grants of NCN: **36**

MNiSW : **2**

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

### 2024

all grants: **61**

grants of NCN: **31**

MNiSW : **4**

UE, NCBiR, NAWA, others: **26**

## Publications

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### 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**

### 2024

Peer-reviewed publications: **434**

BP1: **14** (3 together with BP2, BP3)  
BP2: **107** (48 together with BP3)  
BP3: **301** (50 together with BP1, BP2 or BP4)  
BP4: **63**

## **Main fields of research**

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### **Experimental physics**

- High-energy particle physics – experiments CMS & LHCb, 14\*
- Neutrino physics – experiments T2K, SK, Hyper-K, 10
- High-energy nuclear physics – experiments ALICE, NA61/SHINE, 5
- High-energy lepton-hadron interactions – experiments COMPASS, AMBER 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

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\* approximate number of physicists involved

## **Main fields of research cont.**

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### **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 2024

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presentation	speaker
<i>Halo Asymmetry in the Modeling of Galaxy Clustering</i>	Anna Pearson
<i>Influence of the Gravitational Darkening Effect on the Neutron Star Spectrum</i>	Agnieszka Majczyna
<i>Unveiling the Population of Dust-Rich Quiescent Galaxies in the Distant Universe</i>	Darko Donevski
<i>Shedding Light on Low-Surface-Brightness Galaxies in Dark Energy Surveys with Transformer Models</i>	Hareesh Thuruthipilly
<i>Cosmological Parameters from Newest Baryon Acoustic Oscillation Measurements</i>	Marek Biesiada
<i>Secondary Reactions in Relativistic Fragmentation of Nuclei</i>	Volha Charviakova
<i>Entanglement and Symmetry in High-Energy Scattering</i>	Kamila Kowalska
<i>On a Possible Solution to the Hubble Tension</i>	Jan Ostrowski
<i>Cutkosky Cutting Rules in the Deformed Context</i>	Andrea Bevilacqua
<i>Back-to-Back Dijet Production in DIS: Interplay of Two QCD Formalisms Beyond Leading Power Approximations</i>	Guillaume Beuf
<i>Strange Baryon Highlights from BESIII</i>	Nora Salone
<i>New Constraints on CPT Symmetry Violation in Charm Mesons</i>	Wojciech Krzemień
<i>Study of Direct Photon Production Using ALICE-PHOS Spectrometer at the Highest Attainable LHC Energies</i>	Sushobhan Mandal
<i>Kaon Production by Neutrinos</i>	Katarzyna Kowalik
<i>First Joint Analysis of T2K and NOvA Neutrino Experiments</i>	Juastyna Łagoda