



URGANCH DAVLAT
UNIVERSITETI
—1935—

FACULTY OF PHYSICS AND MATHEMATICS

Physics Department

Information Booklet

$$E=mc^2$$

Urgench — 2026

$$F=ma$$

$$F=G\frac{m_1m_2}{r^2}$$



If we look back at history, we see that physics has been the fundamental basis for almost every discovery and technology in the world.

Indeed, without a deep command of the laws of physics, results cannot be achieved in the fields our time demands — mechanical engineering, electrical engineering, IT, and water- and energy-saving technologies

— PRESIDENT OF THE REPUBLIC OF UZBEKISTAN
SHAVKAT MIRZIYOYEV

Fields and Objects of Professional Activity

Areas and organisations where graduates can work

FIELDS OF PROFESSIONAL ACTIVITY

As a bachelor's programme in the natural sciences, it covers the following professional fields:

- Teaching physics and astronomy in general secondary, specialised and vocational education institutions;
- The Academy of Sciences of the Republic of Uzbekistan and sectoral research institutes;
- Professional fields involving complex problem-solving in state and private general secondary, specialised secondary and vocational institutions.

In addition, a medical physicist:

- Physicist, medical physicist, programmer or research engineer in industry;
- Research institutes of the Ministry of Health of the Republic of Uzbekistan, diagnostic and treatment centres.

In addition, a physicist-programmer:

- Centres for processing and analysing experimental results;
- Fields that solve mathematical equations of theoretical research with computer software;
- Information technology, digital technologies, artificial intelligence;
- Professional fields related to public administration bodies.

OBJECTS OF PROFESSIONAL ACTIVITY

- Institutions of the Ministry of Preschool and School Education;
- Vocational and higher education institutions;
- The Academy of Sciences of the Republic of Uzbekistan and sectoral research institutes;
- Observatories, physics and astronomy laboratories;
- Industrial enterprise laboratories;
- Public administration bodies;
- Developing regulatory documents and teaching technologies for education;
- Businesses of various kinds;
- Non-governmental, non-profit and public organisations.

In addition, a medical physicist:

- Research institutes of the Ministry of Health of the Republic of Uzbekistan, diagnostic and treatment centres;
- Medical laboratories and associations;
- Companies that manufacture and repair medical diagnostic and treatment equipment;
- Medical research organisations.

In addition, a physicist-programmer:

- IT companies;
- Working as engineers, researchers and technologists at companies creating new high-performance materials and technologies;
- Research institutes developing digital technologies and artificial intelligence;
- Working as specialists in software and information-communication technology.

About the Department



The department **in the 1935–1936 academic year** began operating within the Faculty of Physics and Mathematics of the Khorezm State Teachers' Institute. In 1936, Candidate of Physical and Mathematical Sciences, Associate Professor **I.I.Burov**, invited from Leningrad, founded the Department of Physics and Mathematics and a physics laboratory that met the modern standards of its time.

In the post-war years, a major contribution to strengthening the department's material, technical and teaching base was made by **B.D.Yanishev, F.K.Sadretdinova**, Academician of the Academy of Sciences of Uzbekistan **M.S.Saidov, K.Ruzimov, S.Bobojonov, R.Umarova, M.Ibadullayev** and **I.Ko'chqarov** — they set up laboratories with new equipment and fundamentally improved the quality of teaching.

In later stages the department steadily introduced advanced teaching technologies, modern laboratory equipment and international education standards, and today it is one of the university's leading teaching and research units.

Today the department has 27 teaching staff: 1 head of department, 4 professors, 9 associate professors, 4 senior lecturers, 2 lecturers, 4 assistant lecturers and 3 trainee lecturers (full list on pages 02–03). The department carries out joint research projects, grants and student–staff exchange programmes with universities and research institutions in Turkey and India.

HEADS OF DEPARTMENT

1935–1944 I.I.Burov

1944–1951 Y.Shtraus · X.Siddiqov · F.Sadriddinova

1951–1966 Yakovlev · M.Saidov · S.Bobojonov

1966–1990 prof. G.Aripov · E.Qo'shjonov

1991–2017 prof. G.Aripov · dots. O.Atamuratov · dots. U.Aminov

2017–2026 f.-m.f.d. U.Qutliyev

since August 2026 H.Matyoqubov

Teaching Staff



**Matyoqubov
Hikmatjon
Shuhratovich**

Head of Department



**Atamuratov Atabek
Egamberdiyevich**

Professor



**Qutliyev Uchqun
Otaboyevich**

Professor



**Razzokov Alijon
Shonazarovich**

Professor



**Yakubov Komiljon
Ruzmetovich**

Professor



Avezmurotov Ollayor

Associate Professor



**Tangriberganov Ismoil
Urazboyevich**

Associate Professor



**Asatova Umida
Polvanovna**

Associate Professor



**Qurbanov Muzaffar
Qadamboyevich**

Associate Professor



**Bobojonov Komiljon
Abdusharipovich**

Associate Professor



**Abdikarimov Azamat
Egamberganovich**

Associate Professor



**Saparov Xushnodbek
Sharipboyevich**

Associate Professor



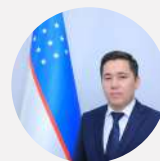
**Karimov Muxtor
Karimberganovich**

Associate Professor



**Otaboyeva Kamola
Uchqun qizi**

Assistant Lecturer



**Xalilloyev Mahkam
Muxammadsharifovich**

Associate Professor



**Jumanazarov Doniyor
Rustamovich**

Associate Professor



**Atamuratova Zuhra
Atabekovna**

Associate Professor



**Bazarboyev Rustam
Baxramboyevich**

Acting Associate Professor



**Qurbanov Davron
Shavkatovich**

Senior Lecturer



**Matchonov Husniddin
Jamoladdinovich**

Senior Lecturer

Teaching Staff



**Ruzimov Kenja
Masharipovich**

Senior Lecturer



**Raxmanov Alijon
Ismoilboyevich**

Senior Lecturer



**Jabbarova Baxor
Olimboyevna**

Senior Lecturer



**Jumaboyev Bezzod
Quronboy o'g'li**

Senior Lecturer



**Qo'shchonova Durdona
Ermatorvna**

Lecturer



**Jumanazarov G'ayrat
Otaxanovich**

Lecturer



**Sadullayev Shuhrat
Ravshanovich**

Assistant Lecturer



**Masharipov Shahzod
Ruzmatovich**

Assistant Lecturer



**Matyakubov Nosir
Shihnazarovich**

Associate Professor



**Otaboyev Mehroj
Uchqun o'g'li**

Assistant Lecturer



**Raxmonova Shirin
Sultonnazorovna**

Trainee Lecturer



**Bekchanova Quvonch
Quvondikovna**

Trainee Lecturer

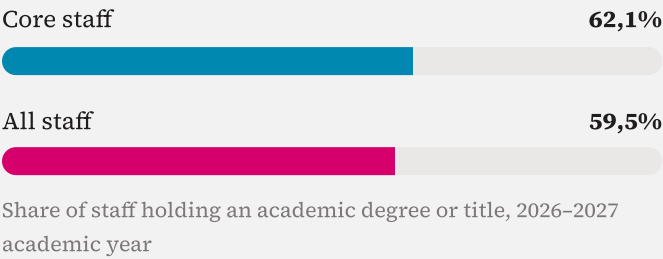


**Sotimova Mahbuba
Kadamovna**

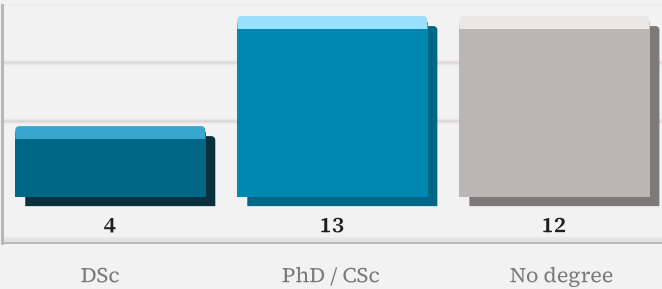
Trainee Lecturer

Research Capacity

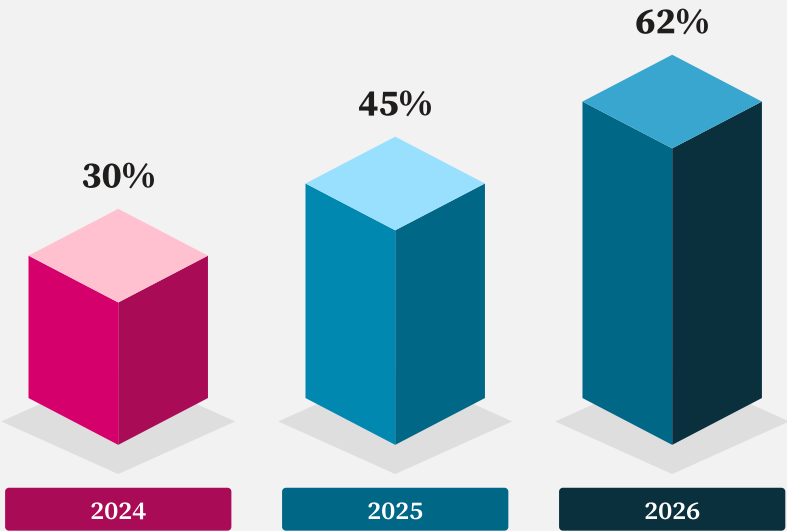
RESEARCH CAPACITY LEVEL



DEGREE COMPOSITION (CORE STAFF, 29 PEOPLE)



RESEARCH CAPACITY OVER THE LAST 3 YEARS (2024–2026)



Research Areas and Degree Programmes

PRIORITY RESEARCH AREAS

01.04.04

Physical electronics

01.04.10

Semiconductor physics

05.05.06

Energy devices based on renewable energy sources

RESEARCH SCHOOLS

- ◆ Research school for modelling nanoelectronic devices and functional materials
- ◆ Semiconductor solar cells, functional materials and renewable energy use

DEGREE PROGRAMMES

Bachelor's

60530900 – Physics

60711000 – Alternative energy sources (solar energy)

60712100 – Renewable energy sources

Master's

70530501 – Physics (by specialisation)

70710413 – Renewable energy sources

70530504 – Semiconductor physics

70530507 – Medical physics

Doctoral studies (PhD and DSc)

01.04.04 – Physical electronics

01.04.10 – Semiconductor physics

05.05.06 – Energy devices based on renewable energy sources



Master's graduates – diploma ceremony

RESEARCH SCHOOL I

Modelling of Nanoelectronic Devices and Functional Materials

Head: DSc, Prof. A. Atamuratov

The school specialises in theoretical and computational study of physical processes in nanometre-scale semiconductor devices. Research covers modelling of modern transistor architectures — FinFET, GAAFET, nanowire and 2D-material MOSFET structures — as well as the electrophysical properties of memristors and single-electron devices.

Most of the work focuses on quantum confinement of charge carriers, short-channel effects caused by gate-length scaling, the influence of randomly placed dopant atoms, and the effect of trap states in the dielectric layer on device characteristics.

The results are published in international journals and form the scientific basis for PhD and DSc dissertations in nanoelectronics and functional materials.

RESEARCH AREAS

- ◆ Modelling FinFET and GAAFET structures
- ◆ 2D-material MOSFETs and tunnel devices
- ◆ Physics of memristors and memory elements
- ◆ Electronic structure of functional materials

COMPUTING BASE

Sentaurus TCAD · Silvaco · Quantum ESPRESSO · MATLAB — device- and material-level simulation

TRAINING

PhD candidates, master's and bachelor's students work within the school as a research group; results are presented at national and international conferences.



Micro- and Nanoelectronics Research Group

Head: Prof. A.E. Atamuratov



Research areas: FinFET · GAAFET · 2D MOSFET · Memristor · Solar cells

RESEARCH SCHOOL II

Research and Training Centre for Semiconductor Solar Cells, Functional Materials and Renewable Energy

Head: Prof. K. Yakubov

The centre was established under Presidential Decree PQ-5032 of 19 March 2021, "On measures to improve the quality of education and develop research in physics". It conducts research on semiconductor materials, solar cells, thin films, heterostructures, tandem solar cells and energy storage devices.

The main focus is researching and improving the efficiency of solar cells based on perovskite, CdTe and other semiconductors. Theoretical work uses VASP, MedeA-VASP, Gaussian, COMSOL Multiphysics and SCAPS-1D.

Experimental work is carried out in a laboratory equipped with a COXEM 200 PLUS electron microscope, Ossila spin coater, Raman spectrometer, solar simulator, PECVD and other modern instruments.

RESEARCH AREAS

- ◆ Perovskite and CdTe solar cells
- ◆ Thin films, heterostructures and tandem structures
- ◆ Hybrid perovskite photocapacitors
- ◆ Effect of external factors on solar panels

PATENTS

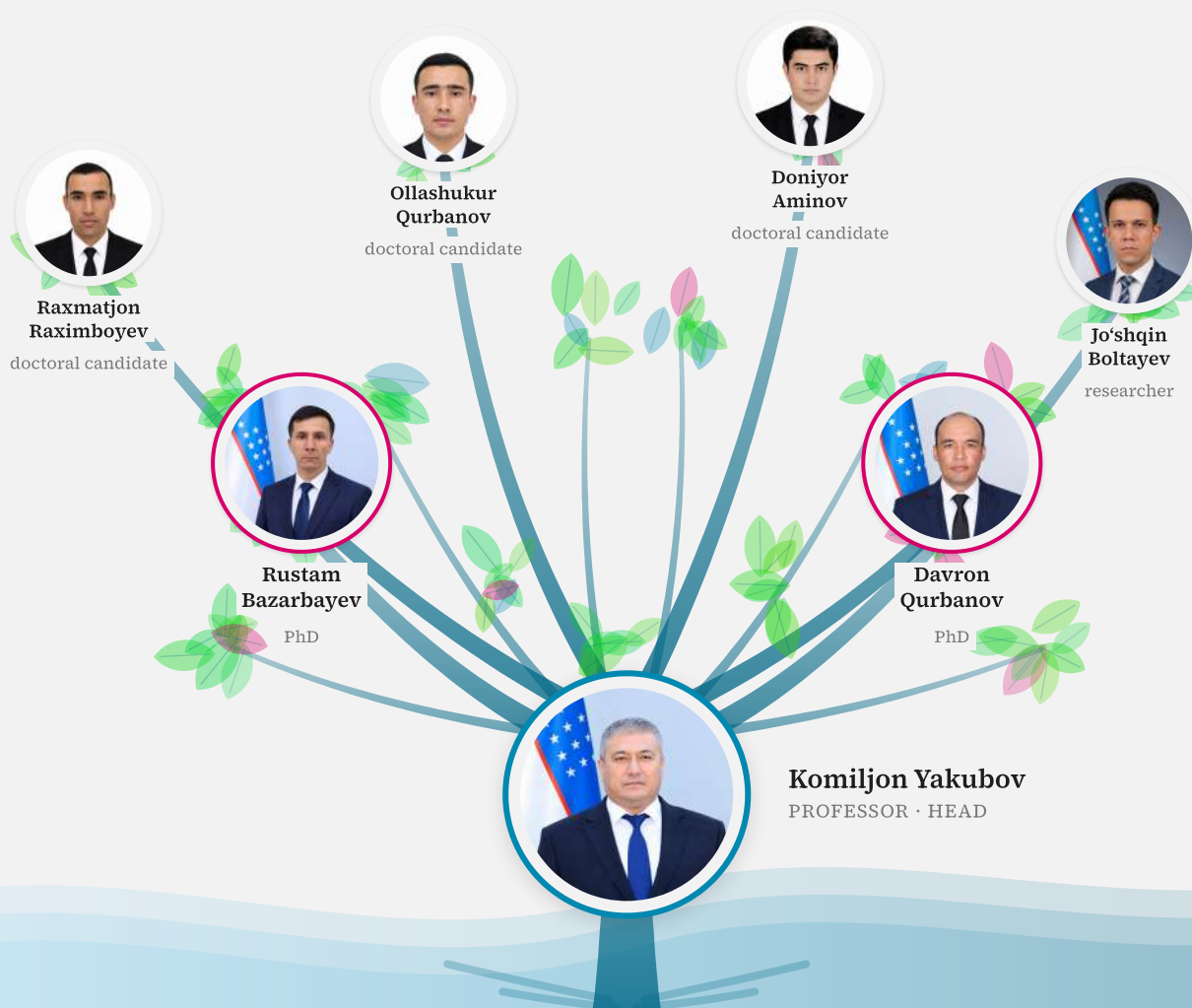
Device for measuring electrophysical and photoelectric parameters of solar panels (FAP02337) · computer-controlled device for studying external factors (SAP 2754) · method for producing aluminium oxide powder (FAP2529)



RESEARCH SCHOOL II

School members

Head: Prof. K. Yakubov



RESEARCH SCHOOL III

Advanced Plasma Research School

The Advanced Plasma Research Laboratory of Urgench State University is a research centre seeking innovative solutions from plasma physics and cold-plasma technologies to energy and environmental problems. Research is conducted using OES and FTIR spectroscopy, modern plasma power supplies, an LCR meter, and by designing, building, testing and applying plasmatrons in real experiments.

RESEARCH OUTPUT

Scopus: 25+ · Google Scholar: 30+ · Patents: 1 — with practical value in clean energy, gas cleaning and wastewater treatment

RESEARCH AREAS

- ◆ Plasma physics and diagnostics
- ◆ Hydrogen production technologies
- ◆ Plasma-material interaction
- ◆ Plasma wastewater treatment
- ◆ Gas cleaning and environmental protection

KEY EQUIPMENT

OES, FTIR spectroscopy · plasma power supplies (DC, RF, pulsed) · LCR meter · plasmatron design and construction

SCHOOL MEMBERS



**Matyakubov
Nosir Shihnazarovich**

Head of Laboratory



**Matyoqubov
Hikmatjon**

Professor



**Karimov
Muxtorjon
Karimbergonovich**

Senior Researcher



**Isayev
Diyorbek Dilshod**

Junior Researcher



**Matyakubov
Jahongir**

Junior Researcher

RESEARCH SCHOOL IV

Modelling of Ion Collisions with Solid Surfaces

Head: Uchkun Kutliyev — Doctor of Physical and Mathematical Sciences, Professor

The school studies the composition, structure and properties of single- and multi-component crystal and thin-film surfaces through computer modelling. Model-based ion scattering spectroscopy makes it possible to study the surface layer of materials without damaging it.

RESEARCH AREAS

- ◆ Modelling inert-gas ion scattering from ideal single-component single-crystal surfaces
- ◆ Modelling inert-gas ion scattering from ideal two-component single-crystal surfaces
- ◆ Modelling inert-gas ion scattering from single-crystal surfaces with surface defects
- ◆ Modelling ion channelling on single- and two-component single-crystal surfaces

RESEARCH BASE

CSIRF software · Ion scattering spectroscopy (half-channel model)

SCHOOL MEMBERS



Kutliyev
Uchkun



Karimov
Muxtor



Ashirov
Atabek



Allabergenov
Bunyod



Sadullayev
Shuxrat



Sattarova
Onaxon

Student Clubs

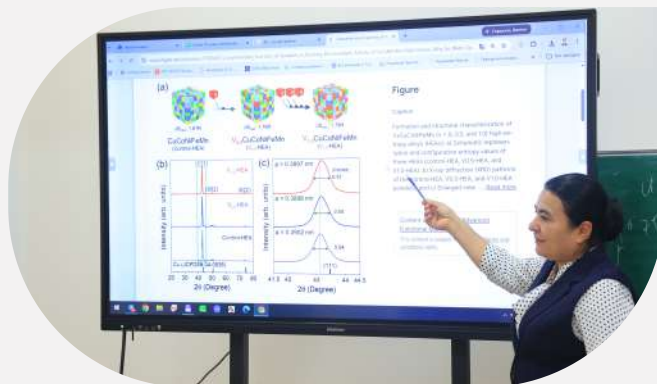


"Astronomy"

Observing celestial bodies, studying astronomical phenomena, hands-on telescope sessions and creative science projects.

- Evening sky observations; identifying planets and constellations
- Observation sessions for events such as solar and lunar eclipses
- Practical sessions with telescopes and spectroscopes
- Writing astrophysics reports and popular-science articles

Once a week · faculty observatory room



"Physics Innovator"

Developing research projects, running experiments, exploring current physics problems, and taking part in conferences and competitions.

- Developing small science and engineering projects and startup ideas
- Laboratory experiments and building experimental setups
- Preparation for national and international olympiads and competitions
- Physics modelling with modern software (VASP, Python)

Twice a week · innovative education centre

Both clubs give students practical experience beyond the classroom, teamwork skills and scientific thinking.

Teaching Rooms and Laboratories

Modern, fully equipped rooms where students build practical skills



General physics laboratories

- ⚙️ Mechanics
- 💧 Molecular physics
- ⚡ Electricity and magnetism
- 📶 Radio electronics
- 🔬 Atomic physics
- 👁️ Optics

Theoretical physics computer lab

- </> Simulation and modelling
- ⚙️ VASP Ab initio



Research laboratory

- ⚙️ Spectral instruments
- 🔬 Nanostructure analysis
- 📊 Modern measuring instruments

Practical and methods classes

- 🔬 Optics and astronomy instruments

Research Equipment

Modern instruments used in the department and the Advanced Plasma Research laboratory



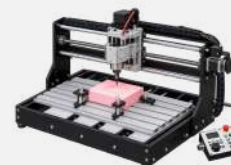
Automated sample processing unit



Sample testing unit (Q-Box)



Inert-atmosphere glovebox



CNC milling machine



3D printer



Optical measuring device



Vacuum coating (sputtering)



Trinocular microscope



Ultrasonic cleaner



Water bath (DCWB10)



LCR Meter (ST2830)



Analytical balance (KERN ACS 300-4)



Magnetic stirrer



FTIR spectrometer (7600S)



Gas flow meter



High-resolution spectrometer

Research Equipment

Solar cell, materials research and measurement equipment



Solar cell I-V test kit (Ossila)



UV ozone cleaner (Ossila)



Spin coater (Ossila)



Four-point probe (Ossila)



Contact angle goniometer



Ultrasonic spray coater



Spectrophotometer (UV-Vis 5100)



Spin coater (CY-SP4)



PV full-test instrument



Digital multimeter (ET 3255)



Optical microscope (ML-5100)



Oscilloscope (Hantek DSO2D10)



Portable spectrometer



Precision balance (AS-320)



Lux meter (Center 530)



Glovebox

International Research Internships

Moments from our researchers' internships and visits to universities and research centres abroad



Partner Universities

International research network



**Urgench State
University**



TU Ilmenau
GERMANY



Ege University
TURKEY



**Jeju National
University**
SOUTH KOREA



VIT Vellore
INDIA



**Western Norway
University of
Applied Sciences**
NORWAY



**Institute of Solid
State Physics**
LATVIA



**University of
Klagenfurt**
AUSTRIA



**B.I. Stepanov
Institute of Physics**
BELARUS



**Tashkent
University of
Information
Technologies**
UZBEKISTAN



**National University
of Uzbekistan
named after Mirzo
Ulugbek**
UZBEKISTAN



Duy Tan University
VIETNAM



**University of
Santiago de
Compostela**
SPAIN

International Research, Last 3 Years

Scopus database · 2024–2026

338

SCOPUS PUBLICATIONS

229

IN Q1 JOURNALS (67.8%)

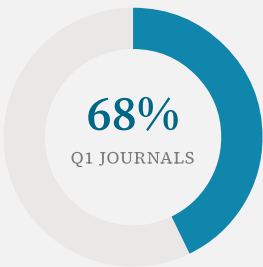
573+

CITATIONS

3

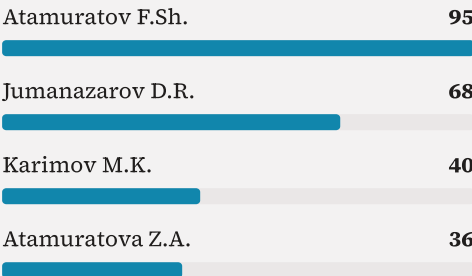
YEARS (2024–2026)

JOURNAL QUARTILE

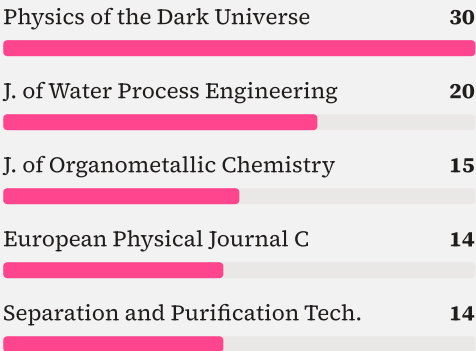
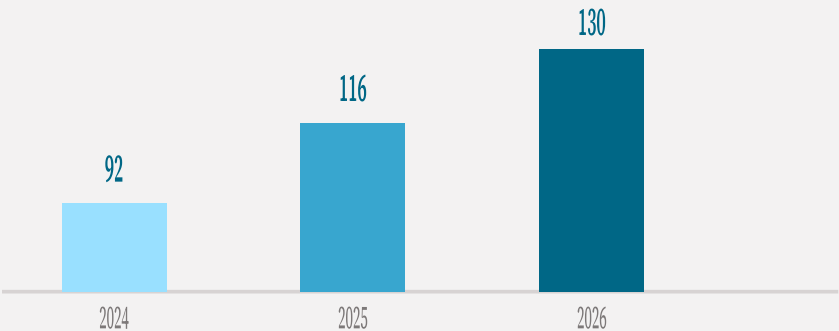


■ Q1 (229) ■ Other (109)

MOST ACTIVE AUTHORS



TOP JOURNALS



PUBLICATIONS BY YEAR

Grants and International Projects

UZB-Ind-2021-88

Uzbekistan–India international cooperation project

Developing composite anti-reflective coatings for solar cells and studying the effect of external factors on solar panels (under Decree PQ-307).

Computer-controlled instrument project

Carried out at Ege University (Turkey) · lead: Assoc. Prof. K. Yakubov

"Building a computer-controlled instrument for comprehensive study of external factors affecting solar panels"; team: D. Qurbonov, R. Bazarbayev, M. Karimov.

HORIZON 2020 · SOMPATY

Grant agreement ID: 873071 · 04.2020–09.2025 · participant: H.Sh. Matyoqubov

"Spectral Optimization: From Mathematics to Physics and Advanced Technology".

Quantum network projects

2023–2026 and 2025–2027 · participant: H.Sh. Matyoqubov

"Controlled quantum transport in low-dimensional nanostructures: modelling and design of networked quantum functional materials" · "Controlled dynamics in low-dimensional open Manakov quantum networks".

AL-9825036033

Uzbekistan–Turkey international cooperation project

Fabricating hybrid-perovskite photocapacitors and optimising their energy efficiency.

FL-8824063312 · 2025–2027

Uzbekistan–Belarus joint fundamental research project · lead: N.Sh. Matyakubov

"Developing a plasma-assisted method for synthesising composite catalysts to decompose volatile organic compounds in air and organic pollutants in wastewater".

MRT-2130213155 · 2022–2024

Uzbekistan–Turkey international project · participant: H.Sh. Matyoqubov

"Quasiparticles and soliton dynamics in branched superconducting materials".

PATENTS

Device for comprehensive measurement of electrophysical and photoelectric parameters of solar panels (FAP02337) · computer-controlled device for studying external factors on solar panels (SAP 2754) · method for producing aluminium oxide powder (FAP2529)

Attracting Foreign Investment

Grant projects carried out by the department and their funding

- 01

UZH-Ind-2021-88 • Uzbekistan–India international cooperation project
"Study of nanostructured hydrophobic and superhydrophobic materials for solar cells". Project lead — K.R. Yakubov.

500 mln
UZS
- 02

Driver project • Anti-reflective coatings
"Developing efficient composite anti-reflective coatings for solar cells". Project lead — K.R. Yakubov.

1 bn
UZS
- 03

Driver project • Computer-controlled instrument
"Building a computer-controlled instrument for comprehensive study of external factors affecting solar panels". Project lead — K.R. Yakubov.

1.5 bn
UZS
- 04

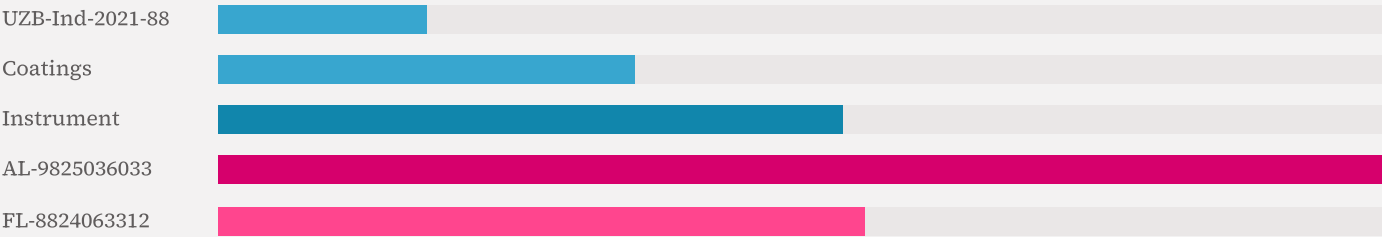
AL-9825036033 • Uzbekistan–Turkey research cooperation
"Fabricating hybrid-perovskite photocapacitors and optimising their energy efficiency".

~2.8 bn
UZS
- 05

FL-8824063312 • Uzbekistan–Belarus joint fundamental project
"Developing a plasma-assisted method for synthesising composite catalysts to decompose volatile organic compounds in air and organic pollutants in wastewater". 2025–2027 • lead — N.Sh. Matyakubov.

~1.553 bn
UZS

FUNDING COMPARISON



TOTAL FUNDING ATTRACTED ≈ 7.35 bn UZS

5 grant projects • 3 international partnerships



URGANCH DAVLAT
UNIVERSITETI
—1935—



$$E=mc^2$$
$$F=ma$$
$$F_g=G\frac{m_1m_2}{r^2}$$

Contact

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Website

urdu.uz/uz/site/departmentview?id=38



Scan the QR code —
the department's official page

$$E=mc^2$$
$$F=ma$$
$$F_g=G\frac{m_1m_2}{r^2}$$