

N° 4

Wednesday, July 8



PHYSICS IN ACTION

MINDS AT THE SUMMIT

Parque Nacional del Chicamocha

Host City: Bucaramanga, Santander, Colombia.

GREETINGS, BRILLIANT MINDS!

Today, we reach the pinnacle of conceptual abstraction, mathematical and physical analysis, and logical reasoning. This is the day when students will be challenged to perform at their very best, requiring absolute focus and unwavering concentration. The morning begins with the orderly entry into the examination halls, where all eyes will turn to the sealed examination packets containing the IPhO 2026 Theoretical Examination. Please pay close attention to every instruction before the exam begins.

Meanwhile, the Team Leaders, after many long nights of discussion, translation, and careful preparation, have earned a well-deserved academic respite. This morning offers an opportunity to relax or enjoy a short visit to some of Bucaramanga's most iconic landmarks, allowing them to recharge before the next stage of the Olympiad.

Theoretical physics provides the universal principles through which we understand nature and shape the world around us. The mathematical models you will encounter today are the very same tools humanity uses to optimize the trajectories of communication satellites, develop the algorithms behind the digital maps on your smartphones, and calculate the distribution of forces in the remarkable viaducts that span the landscape of this city.

Today, both the macroscopic and microscopic universe await your minds to model, understand, and unlock their secrets.

IPhO 2026 Team – Colombia



City tourism

Bucaramanga has a gentle way of captivating its visitors. Surrounded by mountains and offering a pleasant climate, it's a city where you can walk at a relaxed pace, sit in a park, discover a great coffee shop, or watch the sunset from one of its viewpoints.

It is known as “La Ciudad Bonita” for its green spaces, its urban life, and the warmth of its people, offering a welcoming, comfortable, and enjoyable experience. From Bucaramanga, it's easy to set out on routes to majestic landscapes like the Chicamocha Canyon and the “Mesa de los Santos”, or to towns brimming with history, culture, and charm, such as Zapatoca and Barichara, inspiration for the movie Encanto.

Add to that a gastronomy renowned throughout the country, unique destinations, and activities for all interests and ages. Bucaramanga is ideal for relaxing, exploring, and letting yourself be surprised by that Santanderean charm that always invites you to return.

EVENT SCHEDULE

DAY - 4

JULY 8TH: THEORETICAL EXAMINATION



STUDENTS

- 06:00 - 08:00:** Breakfast
- 08:00 - 09:00:** Transfer to Neomundo
- 09:00 - 14:00:** Theoretical Exam
- 14:00 - 17:00:** Sponsor's Fair / Activities
- 17:00 - 20:00:** Dinner at Neomundo (Salon Mega)
- 20:00 - 21:00:** Transfer to assigned hotels
- 21:00 - 23:00:** Free time

LEADERS

- 06:00 - 08:00:** Breakfast
- 08:00 - 09:00:** Transfer to downtown
- 09:00 - 12:00:** Walking tour of Bucaramanga
- 12:00 - 12:45:** Transfer to UAN
- 13:00 - 13:30:** Lunch at UAN
- 13:30 - 14:00:** Transfer to Neomundo
- 14:00 - 17:00:** Sponsors Fair
- 17:00 - 19:00:** Dinner at Neomundo
- 19:00 - 20:00:** Transfer to hotel

OBSERVERS

- 06:00 - 08:00:** Breakfast
- 08:00 - 09:00:** Transfer to downtown
- 09:00 - 12:00:** Walking tour of Bucaramanga
- 12:00 - 12:45:** Transfer to UAN
- 13:00 - 13:30:** Lunch at UAN
- 13:30 - 14:00:** Transfer to assigned hotels
- 14:00 - 17:00:** Sponsors Fair
- 17:00 - 19:00:** Dinner at Neomundo
- 19:00 - 20:00:** Transfer to hotel

WHEN PHYSICS TOOK A FIELD TRIP

After a long day of experimental exams, the students at the 2026 IPhO traded the labs for an outdoor excursion and a full day of discoveries in the mountains of Santander.

The morning began with breakfast and a bus ride to Mesa de los Santos, where conversations quickly shifted from physics to the scenery, cameras, and the question of the day: “How high up are we?” Around 10:00 a.m., the group marveled at the grandeur of the Chicamocha Canyon, taking in the rock formations created by the eastern range of the Andes and the erosion of the Chicamocha River.

The canyon became the highlight of the day. Some may have felt nervous about being at such a high altitude, while others may have enjoyed the sense of freedom offered by this setting; but surely everyone will carry with them the memory of one of the largest and deepest canyons in the world. The canyon’s immensity leaves a unique impression: even the most difficult problem on the exam seems insignificant for a moment.

After the visit, the trip continued to the Casa de Campo Country Club, where lunch was served. The afternoon gave way to recreational activities, which gave the delegations the opportunity to relax, play, compete in a different way, and share moments outside the formal pace of the Olympics.

As evening fell, the students returned to their hotels after a day that reminded everyone that the IPhO isn’t just about solving physics problems. It’s also about discovering new places, forging friendships, and realizing that, sometimes, the best laboratory is the world itself.



GUESTS IPHO



Alexandra Olaya Castro University College London, Dept. Physics and Astronomy (Office B12), Gower Street, London, WC1E 6BT, United Kingdom

Conference: July 10 10:00 a.m. a 10:45 a.m.

Alexandra Olaya-Castro is a Colombian theoretical physicist, currently a Professor in the Department of Physics and Astronomy at University College London. She is known for her work on quantum physics on biomolecular processes, specifically for her research on quantum effects in photosynthesis

Alexandra Olaya-Castro is an internationally renowned Colombian theoretical physicist, recognized as a pioneer in the field of quantum biology. She is currently a Professor in the Department of Physics and Astronomy at University College London (UCL), where she leads research that challenges the boundaries between quantum physics and the life sciences.

Her work focuses on understanding how quantum effects—phenomena typically occurring at subatomic scales—influence fundamental biological processes. She is globally celebrated for her research on photosynthesis, demonstrating that plants and certain bacteria utilize quantum coherence to transport energy with near-perfect efficiency. Her models suggest that molecular vibrations help prevent energy loss, a discovery with profound implications for the development of next-generation solar technologies.

Precision and Boundless Horizons: A Quantum Perspective from Colombia By Prof. Herbert Vinck Posada, Ph.D.

Herbert Vinck Posada is a Colombian physicist and Full Professor in the Department of Physics at the Universidad Nacional de Colombia, Bogotá Campus. His academic career has been devoted to the theoretical description of quantum systems of light and matter, with particular emphasis on cavity quantum electrodynamics, semiconductor quantum dots, polariton physics, photonic crystals, and low-dimensional structures. Through this research program, he has contributed to the development of quantum-optical models that describe how confined electronic states interact with structured electromagnetic environments. At the Universidad Nacional de Colombia, Professor Vinck Posada has combined research, teaching, and advanced student training in areas that connect condensed-matter physics, quantum optics, and quantum technologies. His institutional profile includes active work in quantum metrology, cavity quantum electrodynamics and its applications to quantum information, low-dimensional systems, and micro- and nanocavities interacting with active media. These topics place his work at the interface between fundamental physics and the technological use of quantum coherence, quantum correlations, and controlled light-matter coupling.



FORMER IPHO OLYMPIANS

Mónica Rincón Ramirez

Monica Rincon-Ramirez is a postdoctoral scholar at Penn State University in the United States, where she also earned her PhD in Physics. Before joining Penn State, she completed her MSc at the University of Waterloo through the Perimeter Scholars International program at Perimeter Institute in Canada, and her BSc at Universidad Nacional de Colombia.

Her research spans general relativity, loop quantum gravity, and cosmology, with a particular interest in uncovering new connections between fundamental theory and observations.

During her PhD, she demonstrated how future cosmic microwave background experiments could provide an indirect measurement of the Immirzi parameter, a fundamental coupling constant in loop quantum gravity. More recently, she co-developed the maximum entropy conjecture for black hole mergers, which proposes that the outcome of a black hole merger may be predicted from thermodynamic principles without tracking the full dynamical evolution. This work was featured as an Editor's Suggestion in Physical Review Letters.



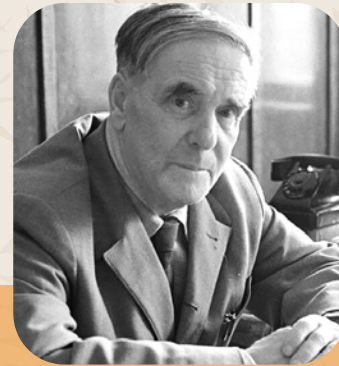
Silver Medal Ibero-American Physics Olympiad (Sorata, Bolivia) • Honorable Mention, International Physics Olympiad (Bali, Indonesia)

Physics was my starting point, and I would not have come this far without the teachers who guided me throughout the Olympiads. Their dedication and passion for teaching sparked a curiosity that has stayed with me ever since. I owe much of what followed to them. My achievements in the Olympiads opened the door to the Monbukagakusho Scholarship from the Government of Japan, which enabled me to study at Tohoku University. There, I graduated with honors in Electrical Engineering, earned a master's degree in Mechatronics and Robotics, and worked as a researcher in rehabilitation robotics for people with motor disabilities.

Over the years, I discovered that what truly excites me is building teams and using technology to create social impact. As Co-founder and CTO of Hogaru (Y Combinator W17), we helped formalize Colombia's home cleaning sector by creating stable, dignified employment opportunities for thousands of people. Today, as CTO of Somos Internet (Y Combinator W21), I bridge engineering and business to develop intelligent infrastructure, starting with better internet connectivity. I am also an Endeavor Entrepreneur, part of a global network that supports high-impact entrepreneurs in emerging markets.

— Óscar Peña, Former Physics Olympiad Participant

DID YOU KNOW...?



July 8, 1894 – Birth of Pyotr Kapitsa

On July 8, 1894, Nobel Prize-winning physicist **Pyotr Leonidovich Kapitsa** was born. Kapitsa became one of the pioneers of **low-temperature physics**, a field dedicated to studying how matter behaves at temperatures close to absolute zero.

His groundbreaking research led to the discovery that **liquid helium can flow with almost no viscosity**, a phenomenon known as **superfluidity**. This remarkable property transformed scientists' understanding of quantum mechanics and opened new avenues in condensed matter physics.

For his outstanding contributions to physics, Kapitsa was awarded the **1978 Nobel Prize in Physics**. Today, his work continues to influence research in cryogenics, superconductivity, quantum technologies, and advanced materials, making him one of the most influential physicists of the twentieth century.

WORD SEARCH PUZZLE

The words can be hidden horizontally, vertically, or diagonally.

EQUILIBRIUM
LEVER
BIOMECHANICS
GRAVITY
VELOCITY
ROTATION
RESISTANCE
ACOUSTICS
FRICTION
BALANCE
INERTIA
TENSION

L	N	R	E	S	I	S	T	A	N	C	E	F	G
I	Z	O	I	G	C	M	K	U	U	Z	R	M	S
Y	M	B	I	V	E	L	O	C	I	T	Y	Z	Q
G	E	U	I	S	R	Y	T	I	V	A	R	G	I
B	S	E	I	O	N	O	T	L	E	V	E	R	N
G	T	Y	M	R	M	E	T	B	H	S	H	H	E
O	H	J	S	U	B	E	T	A	E	F	M	G	R
A	C	O	U	S	T	I	C	S	T	L	X	G	T
J	A	Q	Y	Y	O	B	L	H	R	I	M	N	I
A	L	F	H	O	Q	X	G	I	A	S	O	O	A
G	N	O	I	T	C	I	R	F	U	N	U	N	I
T	U	U	R	B	N	W	F	M	C	Q	I	I	F
R	J	E	G	C	D	B	O	W	R	U	E	C	A
J	F	M	S	E	C	N	A	L	A	B	Z	F	S

PHOTO GALLERY

Olympiads and tourism, in Santander



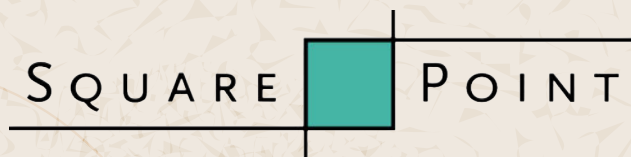
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