

LA-CoNGA physics: an open science education collaboration between Latin America and Europe for High Energy Physics

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On behalf of the LA-CoNGA consortium

41st ICHEP 2022

July 9th 2022



Latin American alliance for
Capacity building in Advanced physics
LA-CoNGA physics



Cofinanciado por el
programa Erasmus+
de la Unión Europea





Scientific Collaboration and education at a global scale

Science and higher education globally distributed, collaborative and multidisciplinary

Virtual research and learning networks play A key role



University-Research-Society link

Data, software tools and research facilities, and teaching resources are Shared



Virtual research and learning network

Internationalization

Collaborative international environment

Accessibility



Each institution/group might not have all the resources/staff



Modernization



Open educational resources, Connectivity, acquisition of Digital skills, and use/development of new learning methods

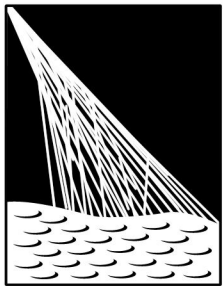
Sánchez, A., and Atlas Collaboration. "The CEVALE2VE case." PoS ICHEP2016 (2016) 322

Caicedo, M., et al. "Virtual research and learning communities in Latin America: The CEVALE2VE case." Interciencia 42.11 (2017): 733-738



HECAP context in LatinAmerica

High energy, cosmology and astroparticle physics (HECAP) community has grown in Latin America in the last decades



PIERRE
AUGER
OBSERVATORY



High Energy Physics
Latinamerican European Network



The European Particle
physics Latin America NETWORK



Latin American Giant Observatory



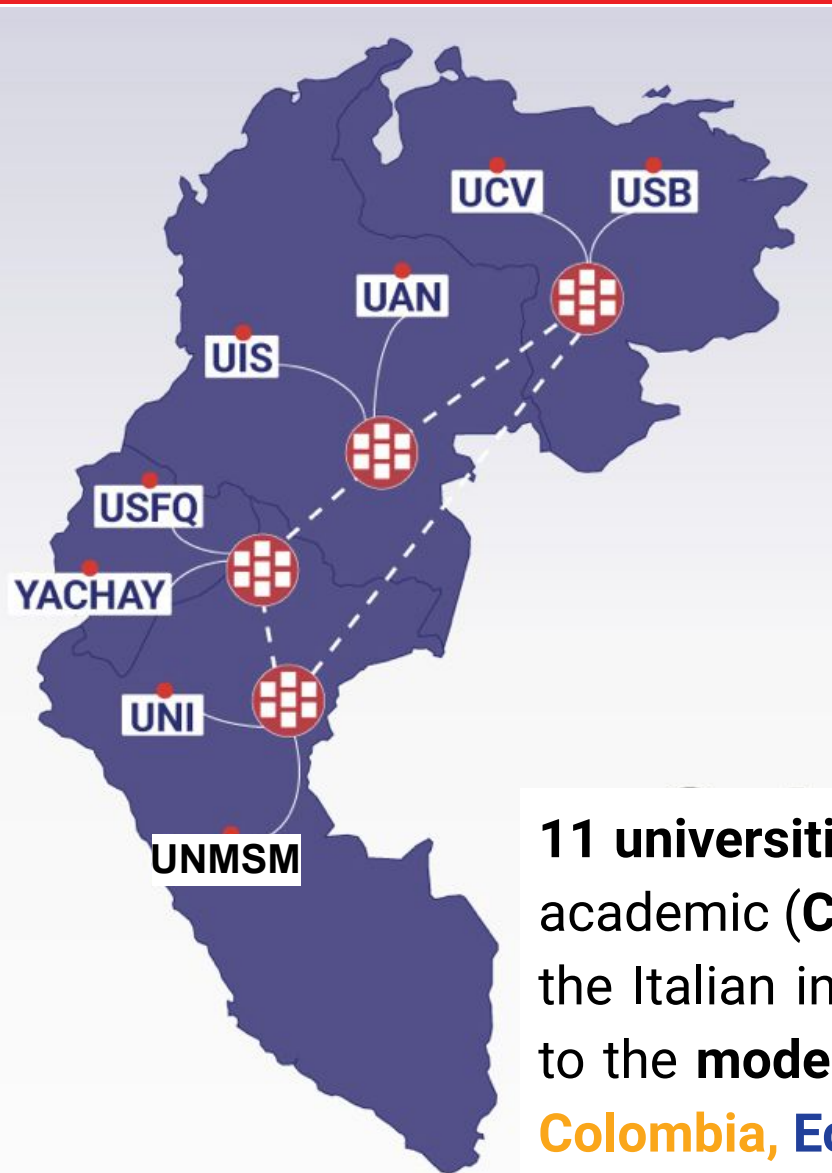
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The HECAP development is nuanced and variable country-by-country, but it has a huge potential thanks to:

- ▶ Critical mass of teachers/researchers in several universities.
- ▶ Diversity of interests and skills.
- ▶ A young generation with potential and eagerness to learn.
- ▶ Collaborative work make us stronger.



What is LA-CoNGA Physics?



An **Erasmus+CBHE (Capacity Building in Higher Education)** project co-funded by the European Commission's Education, Audiovisual and Culture Executive Agency:

- Responding to the strategy of the participating institutions and the capacity building in higher education strategy promoted by the EU



11 universities from Latin America and Europe join efforts with other scientific and academic (**CERN, CNRS, DESY, ICTP, IRFU, RedCLARA**) and **industrial** partners (like the Italian instrumentation company CAEN & data science start-ups) to contribute to the **modernisation, accessibility and internationalisation of higher education in Colombia, Ecuador, Perú and Venezuela**



LA-CoNGA consortium

Program Partners in Europe:

- Université Paris Cité (UPC), France (coordinator)
- Université Paul Sabatier Toulouse, France (UPS)
- Technische Universität Dresden (TUD), Germany

Program Partners in Latin America

- Colombia: UIS (Bucaramanga), UAN (Bogotá)
- Ecuador: Yachay Tech (Ibarra), USFQ (Quito)
- Perú: UNI, UNMSM (Lima)
- Venezuela: UCV, USB (Caracas)

Associated Partners:

- International research centers: CERN and ICTP
- National research centers: CNRS (FR), CEA(FR), DESY(GE)
- Industrial partners in Latin America and Europe
- Other academic partners in Americas





Methodology and Tools

Master-level year common/cross-institutional for 8 institutions in Latin America.

Syllabuses are calibrated with the **Bologna Declaration**, recognized credits and inserted in local Masters programs.

Key subjects of study

- Data Science.
- Instrumentation.
- Advanced Physics, two streams: HEP and Complex Systems.



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Programa académico 2021 LA-CoNGA physics

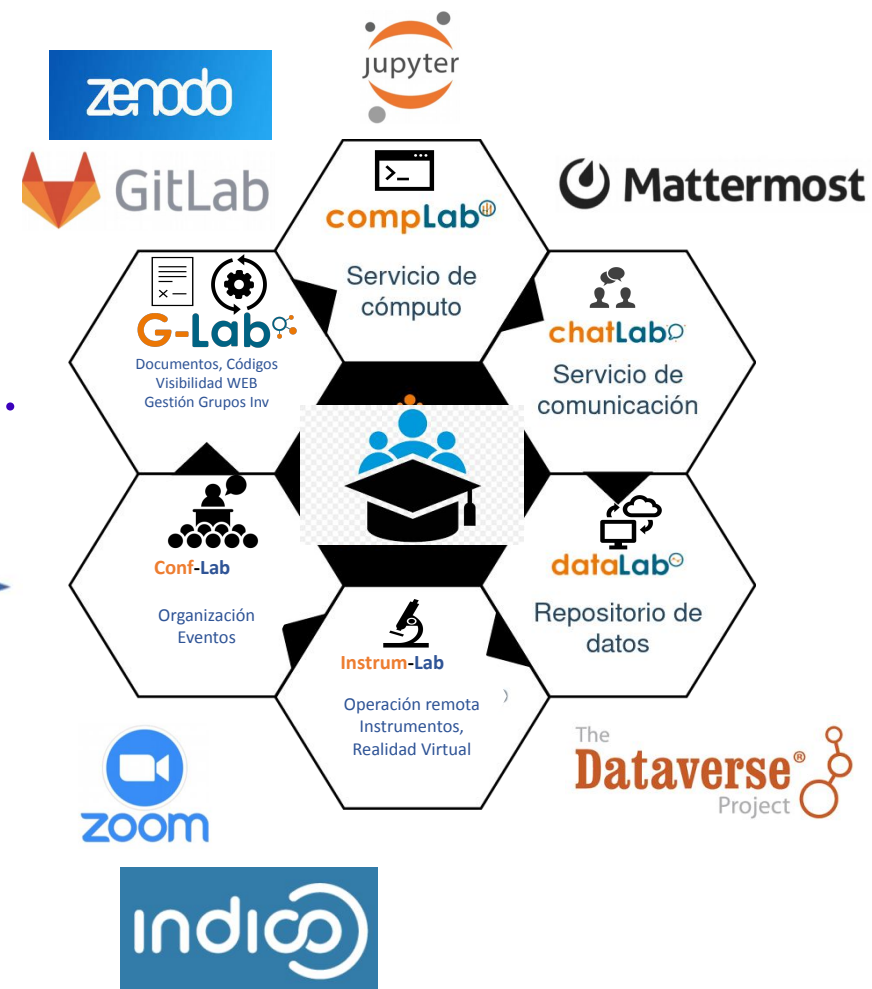
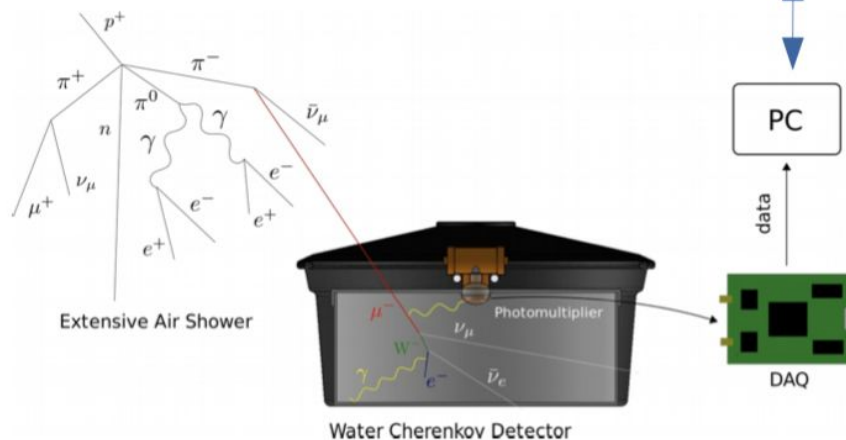
El programa académico de LA-CoNGA physics presenta tres ejes temáticos complementarios:

	Ciencia de Datos	Instrumentación Científica	Teoría
	Provee herramientas y conceptos para abordar el tratamiento y análisis de datos con el fin de realizar inferencias científicas reproducibles.	Orientado a proveer herramientas y conceptos para el desarrollo y uso de sistemas e interfaces en instrumentación científica.	Comprender el formalismo básico de la Teoría de Campos, así como sus aplicaciones en la Física de Altas Energías y la Teoría de los Sistemas Complejos.
Semestre enero - junio 2021	Ingeniería de software para la investigación Arturo Sánchez Pineda, Centre National de la Recherche Scientifique (CNRS-LAPP), Francia. Juan C. Basto Pineda, Universidad Industrial de Santander, Colombia.	Introducción a sistemas de medidas Dennis Cazar, Universidad San Francisco de Quito, Ecuador.	Introducción a la Teoría de Campos José Ocariz, Université de Paris, Francia. Anamaría Font, UCV, Venezuela y Albert-Einstein-Institut, Max-Planck-Institut für Gravitationsphysik, Alemania. Jorge Stephany, Universidad Simón Bolívar, Venezuela.
	Introducción a la estadística José Ocariz, Université de Paris, Francia. Camila Rangel-Smith, The Alan Turing Institute, Reino Unido.	Instrumentación Científica Reina Camacho Toro, Centre National de la Recherche Scientifique (CNRS), LPNHE, Francia. Harold Yepes Ramírez, Yachay Tech, Ecuador.	Teoría de Campos y Mecánica Estadística (Sistemas Complejos) Pierre Pujol, Université Paul Sabatier, Francia.
	Proyectos en Física de Altas Energías Arturo Sánchez Pineda, Centre National de la Recherche Scientifique (CNRS-LAPP), Francia. Javier Solano, Universidad Nacional de Ingeniería, Perú.	Proyectos en Física de Altas Energías Luis A. Núñez, Universidad Industrial de Santander Colombia.	Introducción a la Física de Partículas (Física de Altas Energías) Gabriela Navarro, Universidad Antonio Nariño, Colombia. José Antonio López, Universidad Central de Venezuela, Venezuela.
	Proyectos de Sistemas Complejos en Dinámica Molecular Ernesto Medina, Yachay Tech, Ecuador.	Proyectos en Sistemas Complejos Mario Cosenza, Yachay Tech, Ecuador.	
Semestre julio - diciembre 2021	Electiva I-A Electiva I-B	Hackaton	Ciencia Ciudadana
			Pre-pasantía



More on Metodology and Tools

- An e-learning open-access platform.
- Courses are thought partly remotely from Europe, partly from Latin America.
- Good practices of science reproducibility.
- Remote access interconnected instrumentation labs.
- Teaching material in Spanish.
- 3-months research and/or industrial internships.

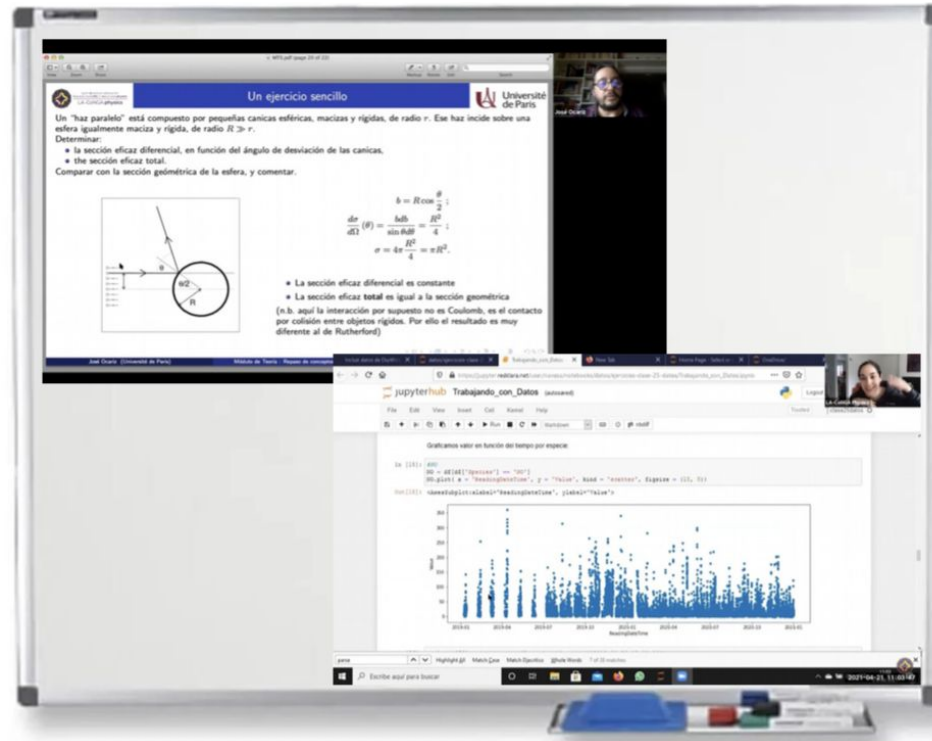
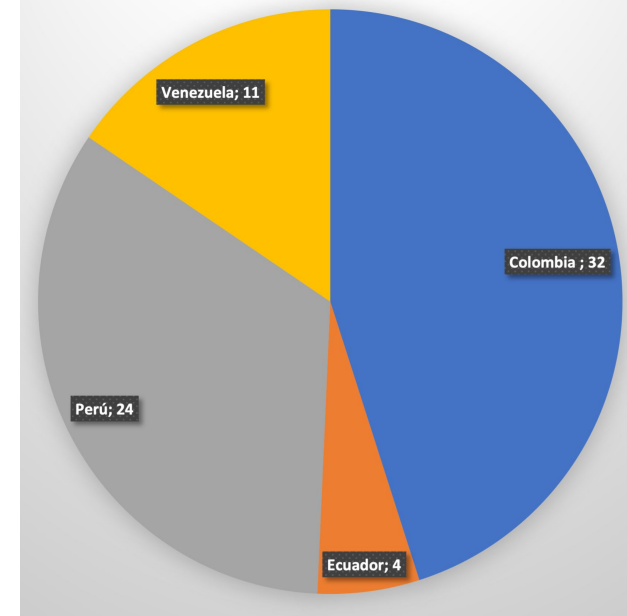




LA-CoNGA Physics in 2021

- 30 instructors from Latin America and Europe.
- More than 50 students from 4 countries completed at least one full course.
- 9 students validated their internships in remote mode.
- More than 100 classes available open access (videos, docs, notebooks, datasets).
- Challenges: COVID, difficulties in accessing universities, internet connection from home ...).

LA-CoNGA Students: Country Distribution



LA-CoNGA physics
International
Network
School

6 - 8 diciembre 2021
Universidad Industrial de Santander
Bucaramanga - Colombia





LA-CoNGA Physics in 2022

- Around the same number of students during the first semester
- Instrumentation labs installed 😊
 - Unique interconnected network of instruments: CAEN kits for Nuclear Physics experiments, National Instruments laboratory toolkits, air-quality monitoring stations for high-school science labs and computing stations.





LA-CoNGA Physics in 2022

- Second semester has already started!
- Internships will start in September: we expect to have internship mobility for the first time!  





Beyond the courses

- Other academic activities: seminars, mentorships.
- Scientific outreach: workshops about science communication.
- Transversal to other communities: hackathon co-Afina 2022, citizen science projects with high-schools in the Region.

A community with values:

- ✓ Collaboration
- ✓ Diversity
- ✓ Open access
- ✓ Responsibility
- ✓ Innovation
- ✓ Respect



Mujeres que hacen Física

Historias de mujeres académicas en América Latina y Europa: trayectoria y vida

#QueremosSerMás

11 febrero 2022 | 9h00 Col - Per - Ecu / 10h00 Ven / 15h00 CET

Día Internacional de la Mujer y la Niña en la Ciencia

Moderado por:
Reina Camacho Toro (CNRS, Francia)
Joany Manjarrés (TU-Dresden, Alemania)

Invitadas que hacen vida científica en Ecuador, Colombia, Suiza y Francia

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Sigue la actividad via **YouTube**
LA-CoNGA Physics

CILAC 2021
FORO ABIERTO DE CIENCIAS
LATINOAMÉRICA Y CARIBE

LA-CoNGA physics presenta

Ciencia abierta, infraestructura compartida y redes de colaboración

el reto de la nueva educación superior

SESIÓN TEMÁTICA

Yuma Inzolia
UNESCO-IESALC

Luis Elícor Cadenas
RedCLARA

Fernando Quevedo
LASFARI

Bianca Amaro
LA Referencia

Reina Camacho
LA-CoNGA physics

Rafael Anta
BID

Miércoles 28 de abril 2021 | 14:00 GMT

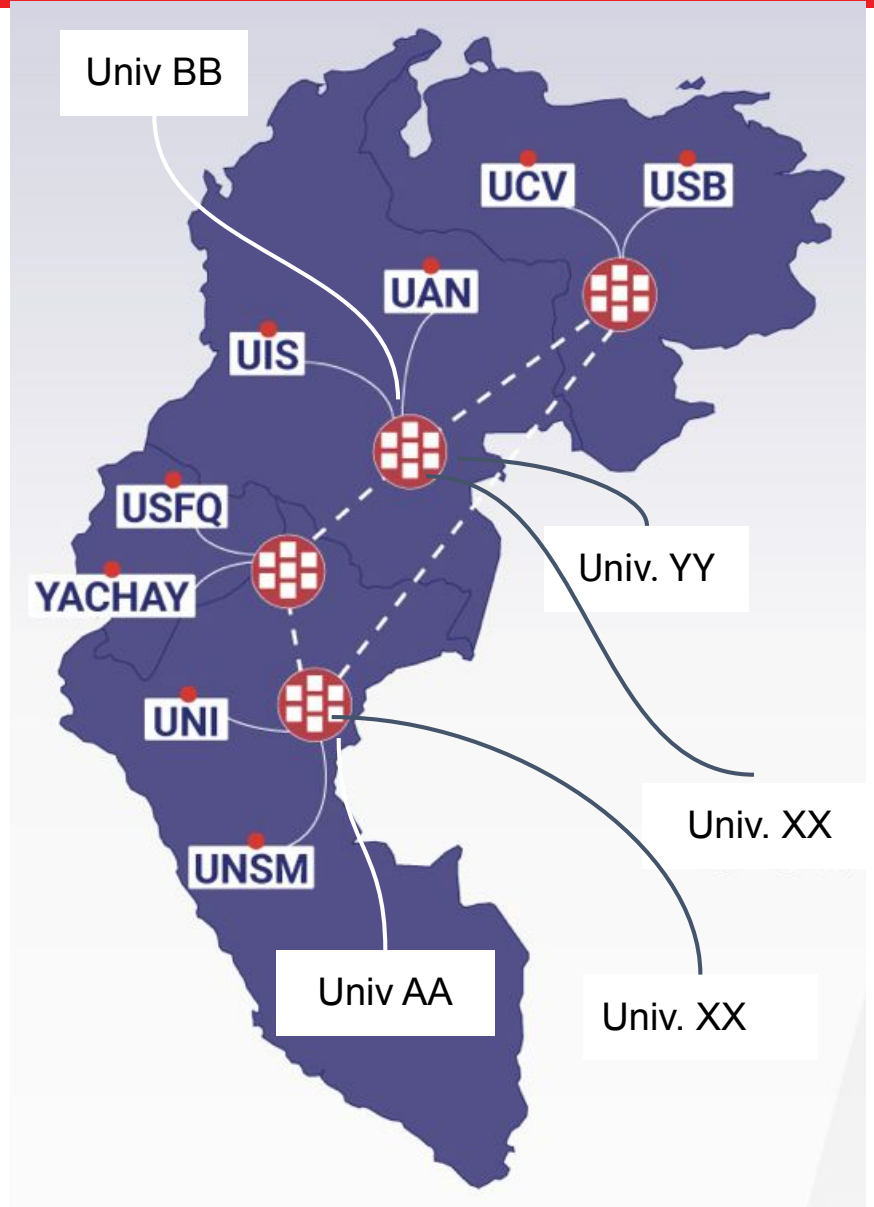
9:00am (Bogotá) / 10:00am (Caracas)
11:00am (Sao Paulo) / 16:00pm (Madrid / Paris)

IESALC
CLARA
LA Referencia
LA-CoNGA physics
BID



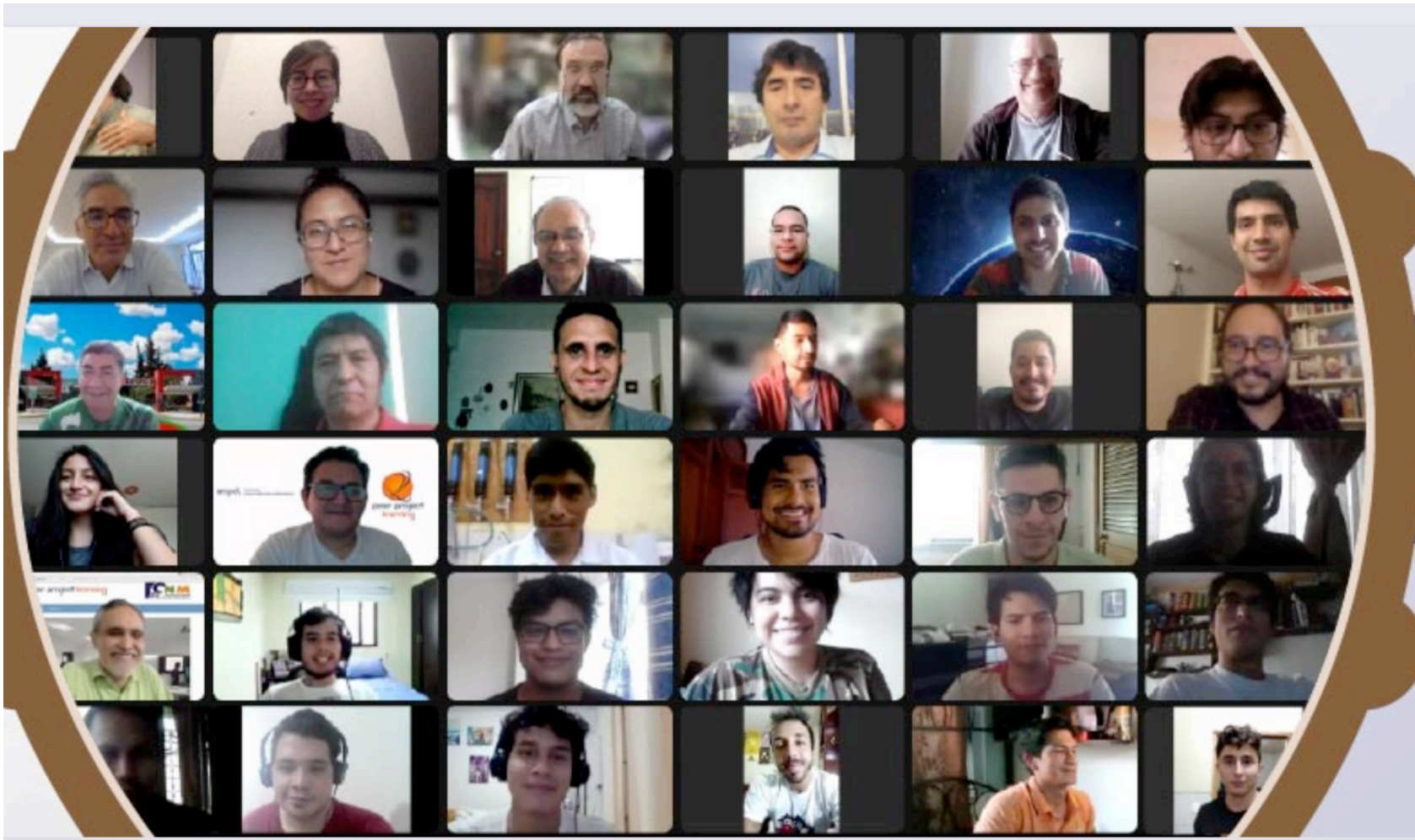
Current objective:

- Currently requesting a 1-year extension of the project to consolidate the current activities.
- Ensure sustainability beyond initial funding period.
- Strengthen the network and reach other institutions in the region.
- Continue contributing to the capacity building, talent pipeline and intraregional and European-Latin American networking.





Thanks!





<http://laconga.redclara.net>



contacto@laconga.redclara.net



lacongaphysics



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Mission and Vision

Mission

We have built and developed a sustainable, dynamic, interconnected, wide-ranging network of Latin American and European researchers in Advanced Physics, with close ties to the productive sector, leading to the development of science and technology in the region. Together we contribute to the updating, accessibility and internationalization of higher education systems in the region. We promote the creation of similar communities in other areas of knowledge.

Vision

- Cooperation
- Respect
- Diversity
- Open Access
- Transparency
- Community
- Innovation
- Open/free discussion
- Leadership
- Valorization

