

Minorities in physics

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SILAF AE 2024

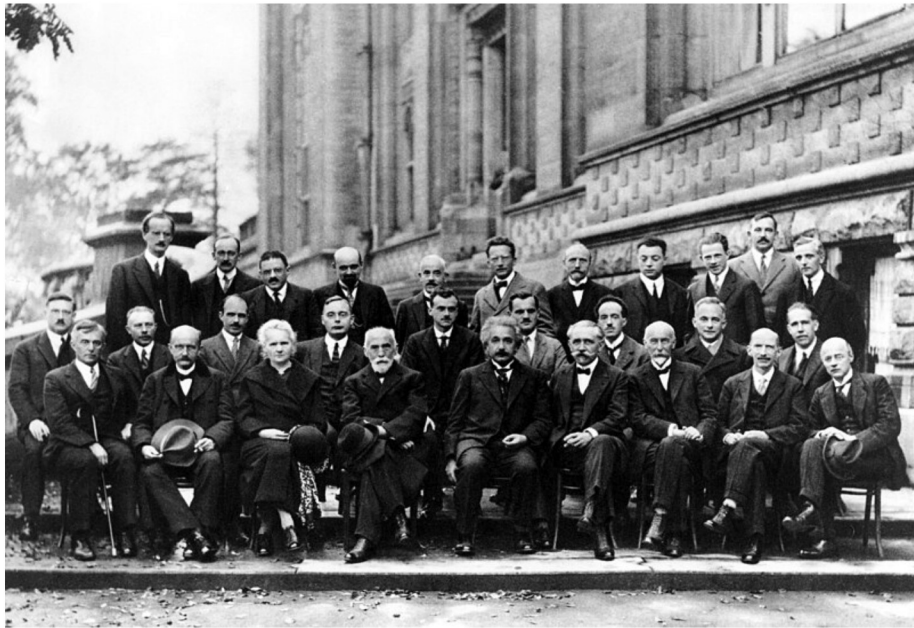
Cinvestav, Mexico City, Mexico

November 4-8, 2024



Let's introduce some terms useful for this talk

Disclaimers: 1) Not speaking on behalf of ATLAS; 2) not an expert of the topic from the sociology point of view; 3) I will focus mainly on particle physics due to my professional bias. 4) Probably more questions than answers, as my goal is to start a discussion/reflection on the topic



5th Solvay Conference on physics
“Electrons and Photons” in 1927

Would you say is it a diverse group?

- **Minority group:**

- A group that experiences a narrowing of opportunities (success, education, wealth, etc) that is disproportionately low compared to their numbers in society

- **Diversity**

- The presence of differences within a given setting. Valuing diversity in the workplace is about recognizing and leveraging people's differences

More diverse?



Why should we care about diversity?

Tracey Berry, ICHEP 2024

Everything is fine

It's nothing to do
with me!

There are so
many barriers

We need things
to improve!

Everything is fine for me but I see barriers for others

- **Needs:** Some studies suggest that a team with a good mix of perspectives is associated with increased productivity

- **Fairness:** Morally, we are (usually) publicly funded; all who want to participate ought to have the opportunity

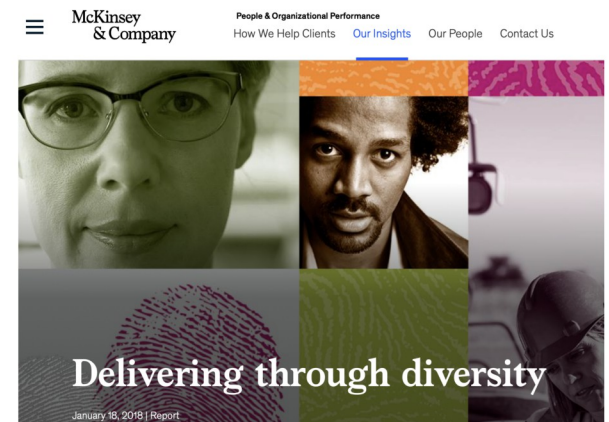
> [Proc Natl Acad Sci U S A.](#) 2004 Nov 16;101(46):16385-9. doi: 10.1073/pnas.0403723101. Epub 2004 Nov 8.

Groups of diverse problem solvers can outperform groups of high-ability problem solvers

[Lu Hong](#)¹, [Scott E Page](#)

Affiliations + expand

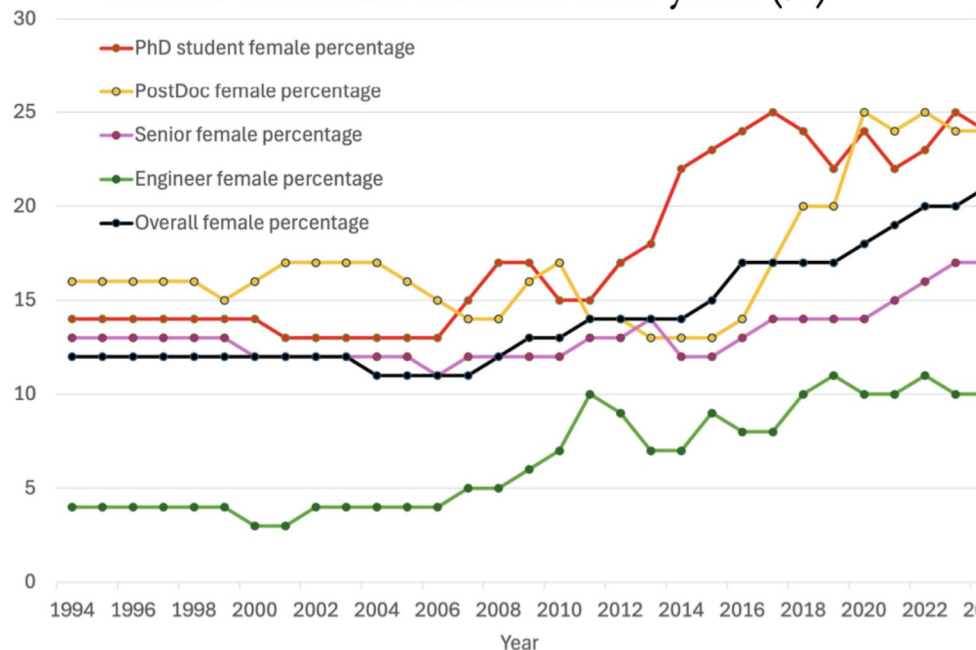
PMID: 15534225 PMCID: [PMC528939](#) DOI: [10.1073/pnas.0403723101](#)



Gender diversity

Irina Nasteva, ICHEP 2024

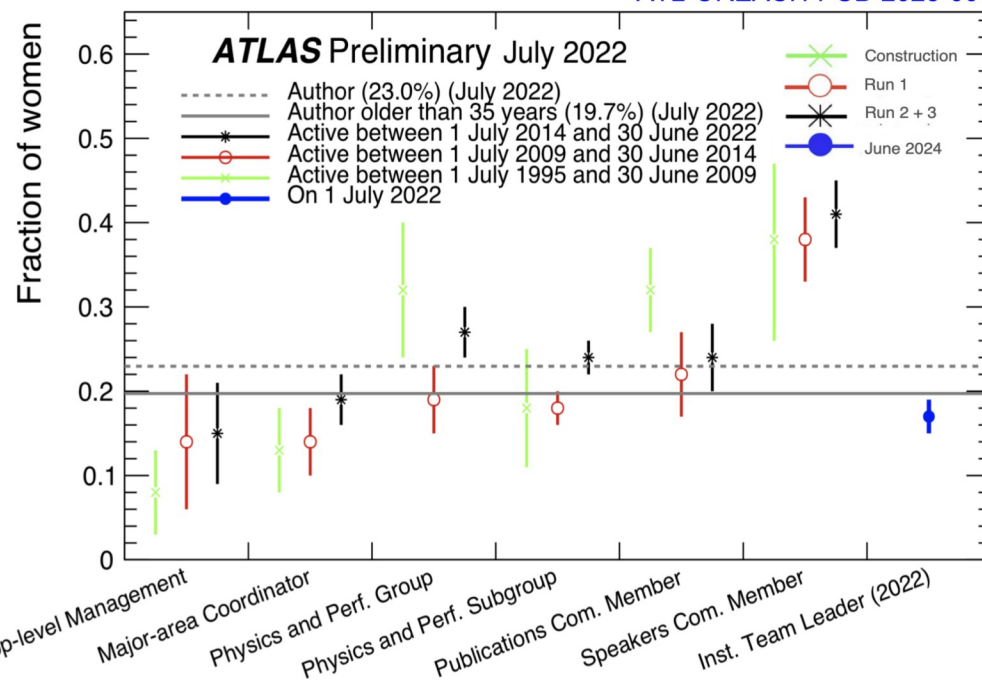
Trends of female fraction over years (%)



LHCb Collaboration stats:

- Fraction of women students and post-docs is above the collaboration average, ~25%.
- Increasing trend for PhD students and post-docs/improving trends for new generations?
- Fraction of women seniors is lower and increases more slowly
- Fewer women engineers and technicians

ATL-OREACH-PUB-2023-001



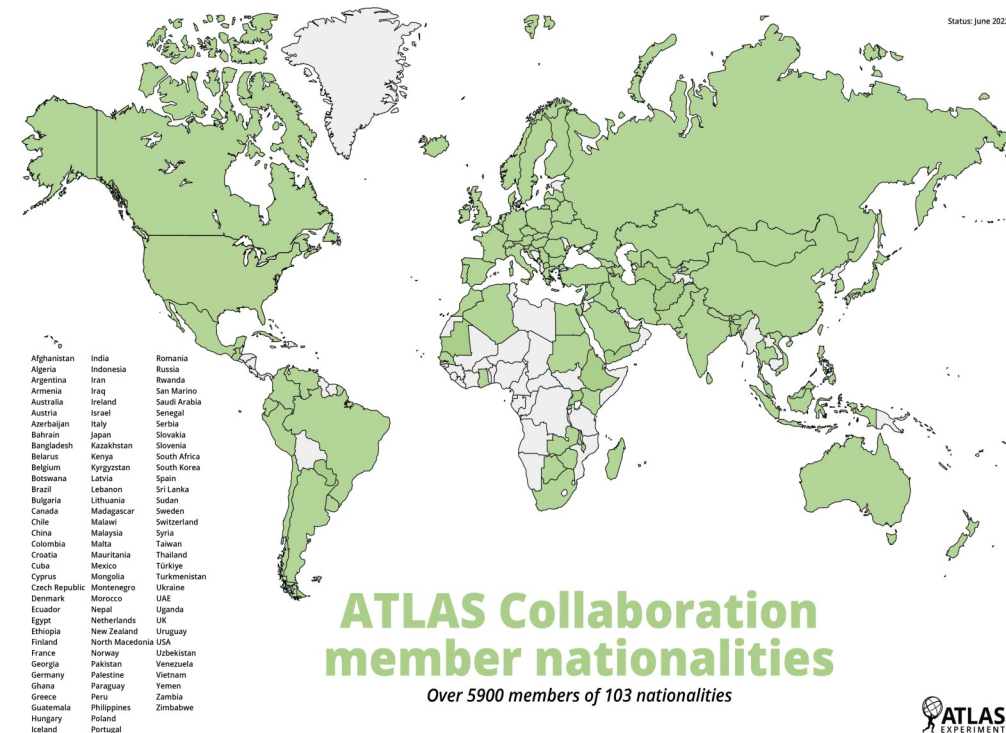
ATLAS fraction of women in leadership

- Roles ordered approximately by level of responsibility
- Globally we see the fraction decreases as the level as responsibility increases
- Improvements also observed in the last years

Geographical diversity

■ Information from the ATLAS Collaboration at CERN

ATLAS-PHOTO-2019-001

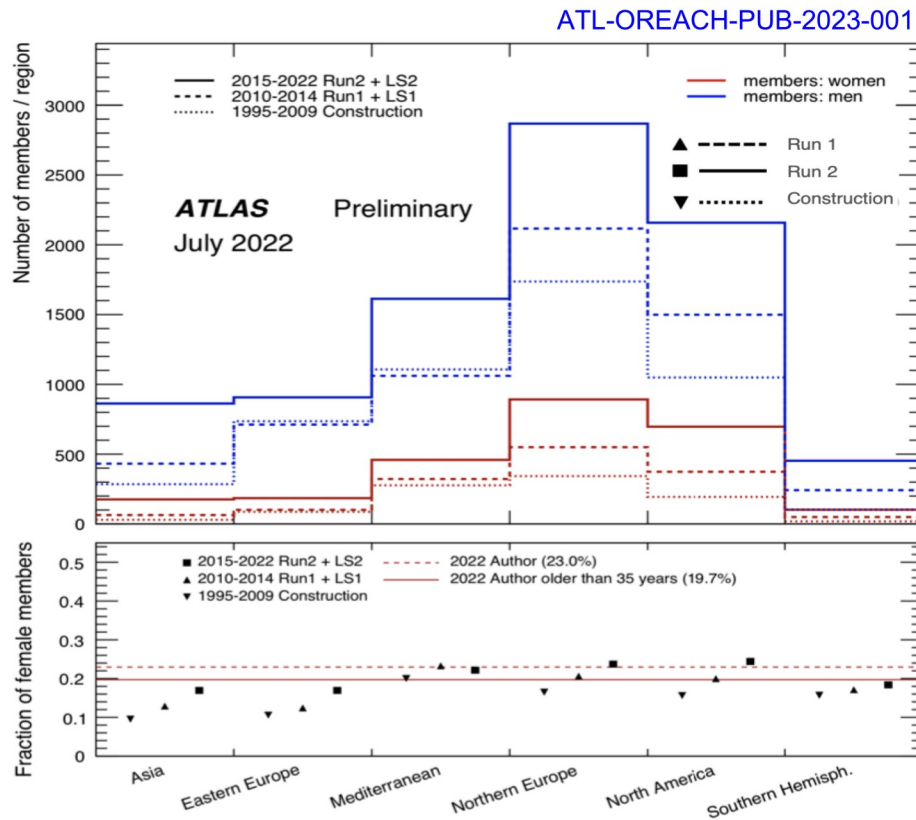


Over 5900 members of 103 nationalities
(2022)



183 Institutions (251 institutes) from 41
countries (2024)

Many more dimensions when talking about diversity



Number of ATLAS members by home institution (2022)

Asia: Armenia, Azerbaijan, China, Georgia, Japan, Taiwan

Eastern Europe: Belarus, Czech Republic, Poland, Romania, Russia (including JINR Dubna), Serbia, Slovakia, Slovenia

Mediterranean: France, Greece, Israel, Italy, Portugal, Spain, Turkey, Morocco

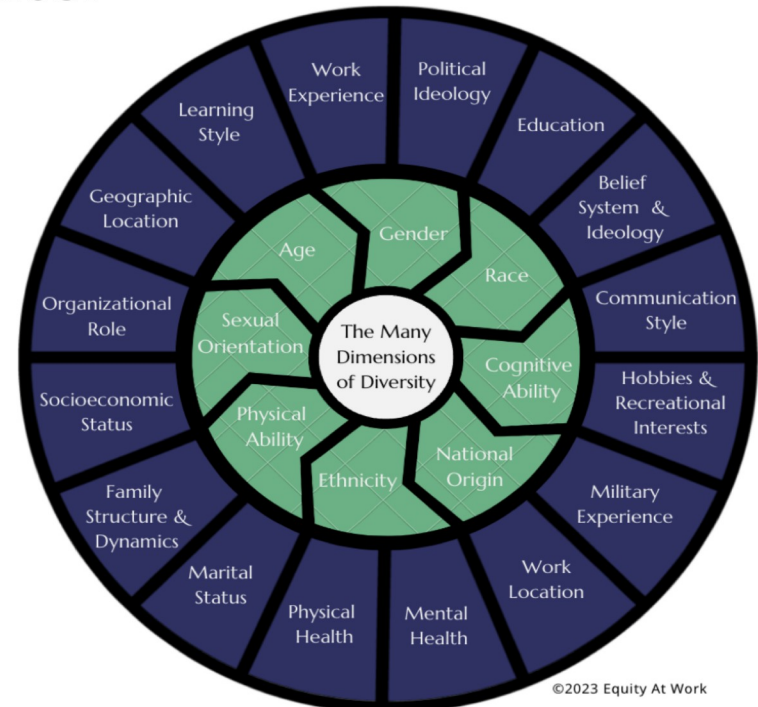
North America: Canada, USA

Northern Europe: Austria, Denmark, Germany, the Netherlands, Norway, Sweden, Switzerland (including CERN), UK

Southern Hemisphere: Argentina, Australia, Brazil, Chile, Colombia, South Africa

Intersectionality:

- The interconnected nature of social categorizations such as class, age, gender, etc, regarded as creating overlapping and interdependent systems of discrimination or disadvantage
- Statistics illustrate the impact of intersectional identities on diversity in physics!



Our journey to SILFAE

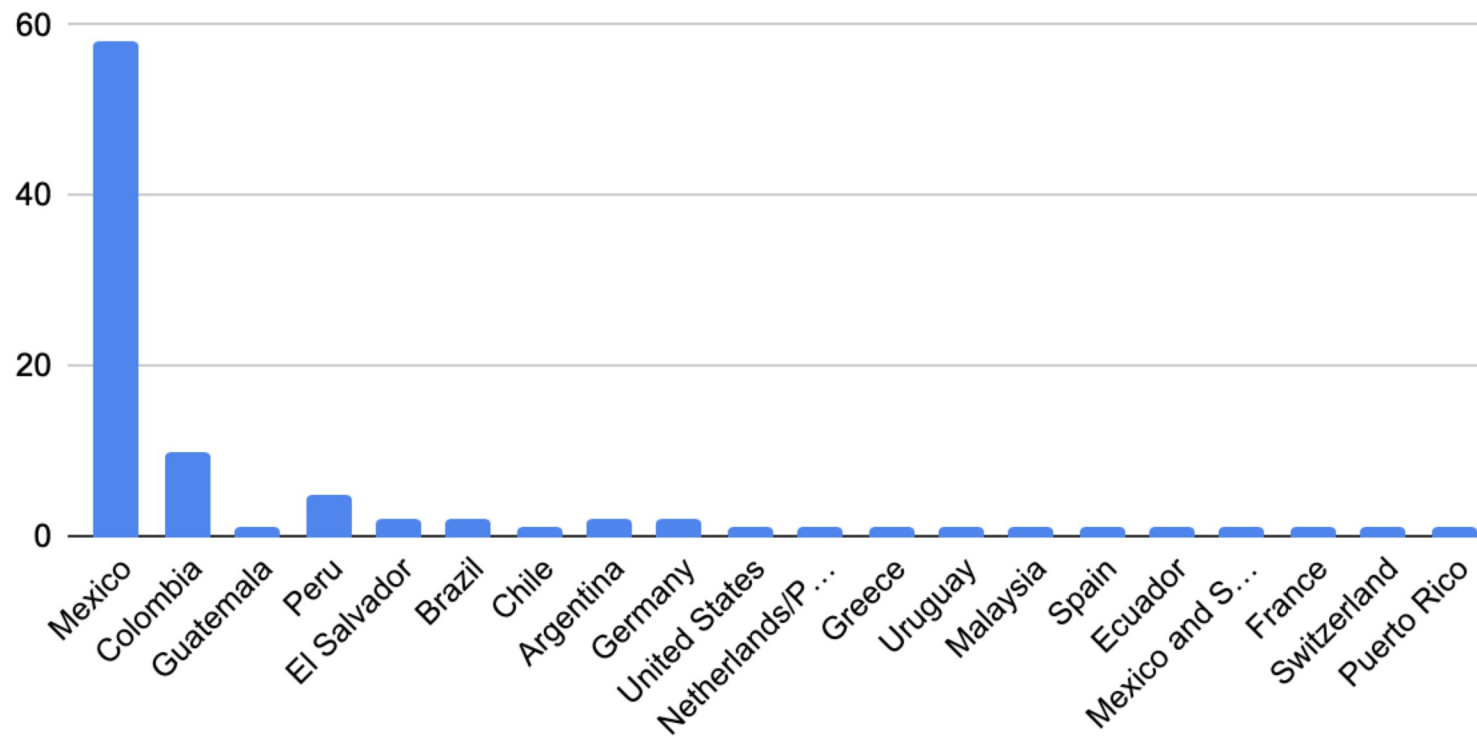
- **All our journeys were probably different (again diversity!), but being sit here together indicate that we were given opportunities. Depending on the work we do, its quality and visibility, but also on many other variables :**
 - **Your career so far:**
 - How did you choose your university? Your PhD? What opportunities those decisions opened? Did your family supported your career choices (economically and affectively)? When/how did you hear about particle physics?
 - **Invitation to the conference: selection process**
 - Career stage, nationality, gender, working on a hot topic, your network
 - **Travel to México:**
 - Visa/passport, age, mobility, health
 - **Funding**
 - Was it easy to get the funding? Any funding bias in your academic system?
 - **Home arrangements**
 - Caring responsibilities? Children? Expectations might be different according to age, gender, ethnicity



Who is at SILFAE 2024?

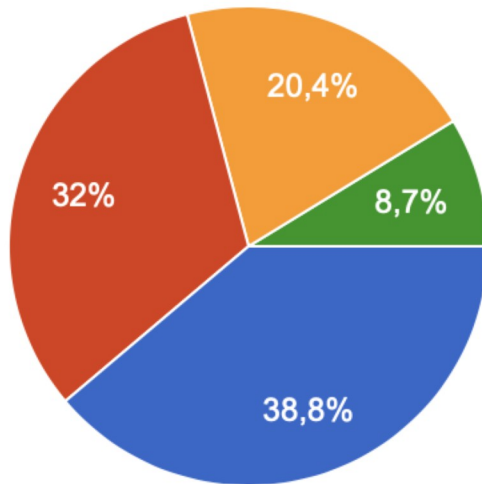
- Thanks to all of you who filled this survey, in such a short notice
 - 103 number of replies
- Questions were not mandatory, in some cases we have empty responses

From which country are you from?



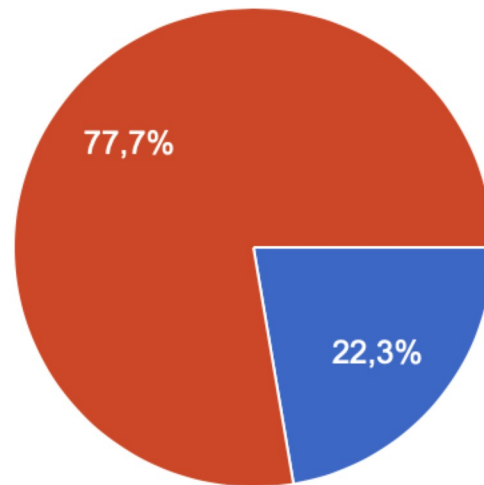
Who is at SILFAE 2024?

About age...



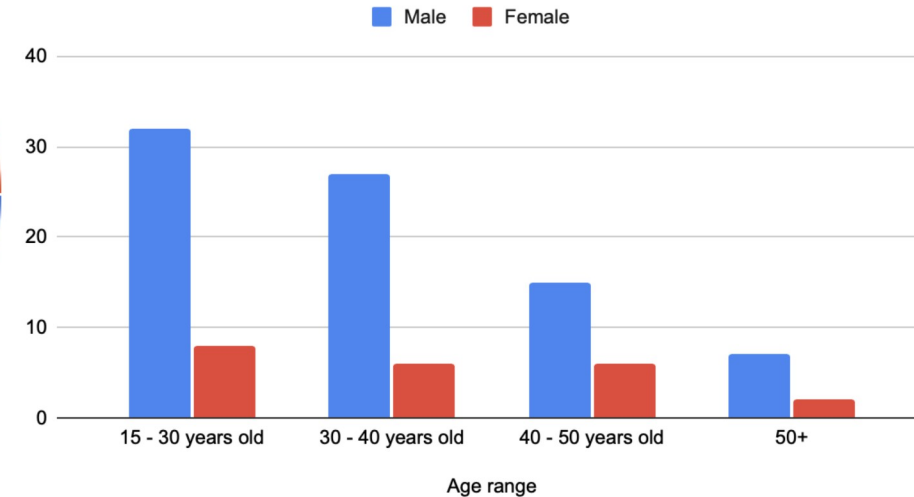
- 15 - 30 years old
- 30 - 40 years old
- 40 - 50 years old
- 50+
- Prefer not to answer

About gender...



- Female
- Male
- Non binary
- Prefer not to answer

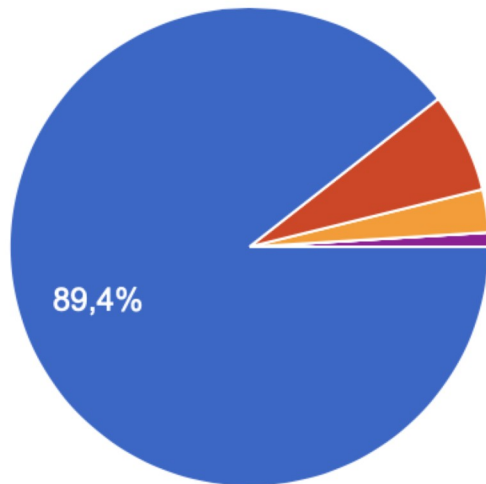
Correlating both



Who is at SILAF AE 2024?

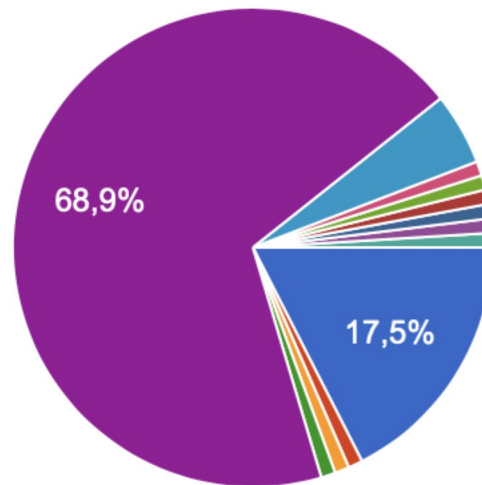
- Minorities within the minorities
 - What Latin America is present this week?

About Sexual orientation...



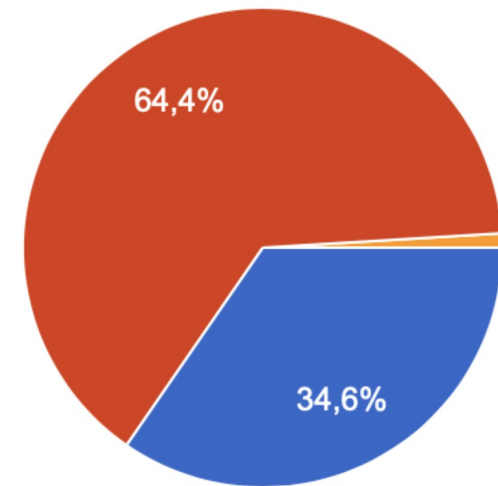
- Straight/Heterosexual
- Gay or Lesbian
- Bisexual
- Prefer not to answer
- Asexual homoromantic

How do you identify as?



- White
- African/African descent
- Asian/Asian descent
- Indigenous
- Mestizo
- Prefer not to answer
- None of the above, but I wouldn't know
- Mexican
- White-Asian
- There is no race
- Multi-race
- Greek

Where you the first (or one of the first ones) in your family going to college?



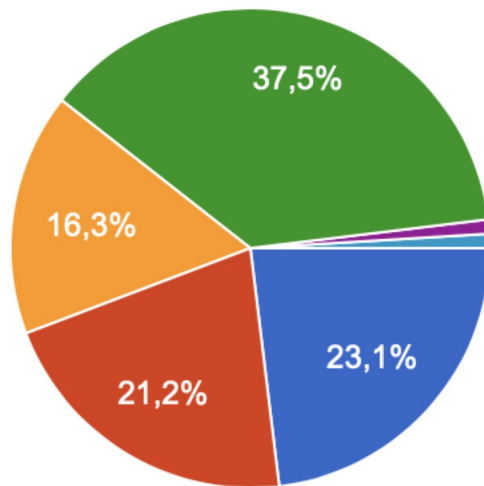
- Yes
- No
- Prefer not to answer

Race as a
social/political concept.
Not biological

Who is at SILFAE 2024?

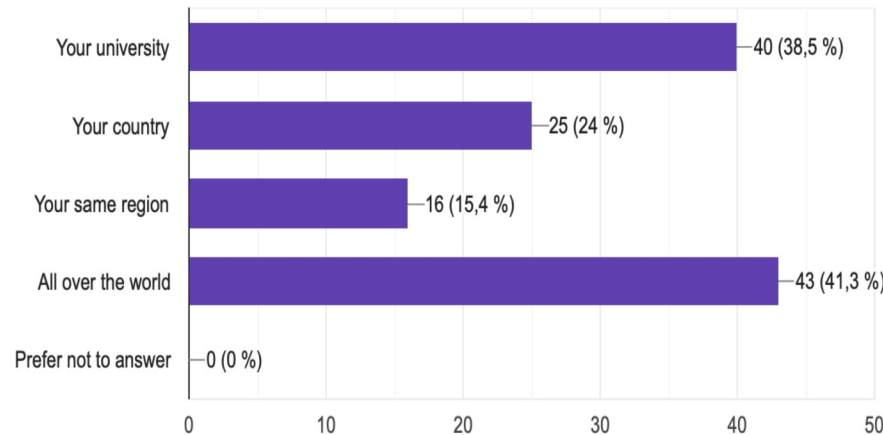
About our work...

Your position is:

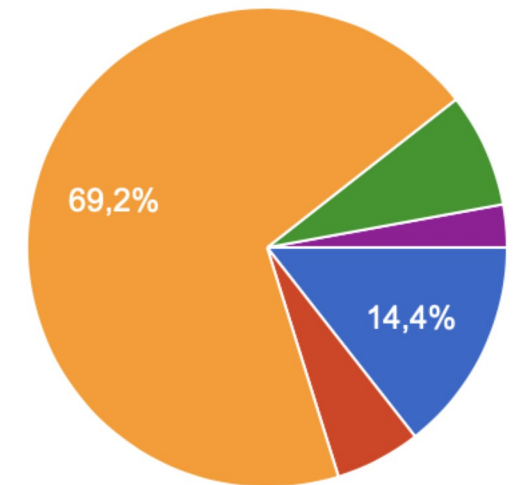


- I am an undergrad/Master student
- I am a PhD student
- I am a postdoc
- I have a permanent position
- Prefer not to answer
- Professor with no permanent position

The majority of your closest collaborators are in (multiple options allowed):



Which of this statements represents you the best?



- I am from the Global North and work/live in the Global North
- I am from the Global North and work/live in the Global South
- I am from the Global South and work/live in the Global South
- I am from the Global South and work/live in the Global North
- Prefer not to answer

Diversity alone does not guarantee inclusion

- **Equity**

- The process of ensuring that practices and programs are impartial, fair and provide equal possible outcomes for every individual

- **Inclusion:**

- Or inclusivity refers to the practice of ensuring that people feel welcome, a sense of belonging in the workplace and are able to contribute optimally. This means that every employee feels comfortable and supported by the organization when it comes to being their authentic selves

- **Diversity alone does not guarantee inclusion**

- **Minorities underrepresented in science is a continuing cycle**

- The lack of diversity in STEM is caused by a lack of representation and opportunities in these technical fields
- **Let's review some of the diversity and inclusion initiatives in the collaborations and the community in general**



What is the HEP community doing?

- Let's review some of the diversity and inclusion initiatives in the collaborations and the community in general
- A few examples, based on my current knowledge, not an exhaustive list at all

Primary/middle school:

- Minimum bias
- Usually open, creative, curious minds

High school

- A STEM career?
- Not for me
- It is too hard!
- What do I do with such degree?

University

- Lack of role models
- Isolating?
- Where do I go next? Opportunities?

PhD/postdoc

- Opportunities?
- Am I 'outstanding' or 'excellent'?
- Salary gaps
- (Family penalty)

Mid-career

- Salary gaps
- Promotion bias
- Funding bias
- Lack of mentoring
- (Family penalty)



Engage → Recruit → Retain → Sustain

Opening the door (1/2)

- **Outreach** is essential to communicate our scientific endeavors to the general public & to create a more diverse scientific community

- To encourage kids/teenagers who might otherwise not consider science as an option
- Consider: different languages, close captioning, multiple cultural representation, different career stages, etc



Countries booking virtual visits in 2023

Brazil UK Greece Sweden USA India Australia
 Germany Italy Colombia Switzerland Slovakia Morocco
 Norway Ukraine Turkey Congo Others (14 countries)

Languages of virtual visits in 2023

English Portuguese Spanish Greek German
 Italian Slovak French Others (3 languages)

ATLAS virtual visits in different languages. Picture from Fundación Educativa de Montelíbano, Córdova,, Colombia

The ALICE-ICN group invites high-school students to participate in the

PARTICLE THERAPY MASTERCLASS

MARCH 13&14|2023

International Masterclass on Particle Therapy

13-14 March 2023
ICN-UNAM (Virtual)
Mexico/General timezone



Universidad Nacional de La Plata Argentina (2017)



UNI, Peru, 2017

IPPOG masterclasses co-organised by several institutions in Latin America

ICTP Physics Without Frontiers activities have been organised by several actors in Latin America since 2016. Next one in Guatemala-Honduras-Costa Rica!

Creating equitable opportunities in the house (1/3)

■ Mobility, training and education

- Mobility programs with the support of the European Commission like **HELEN** (High Energy Physics Latin-American European Network) or **ePLANET** (European Particle Physics Latin-American Network) were key in strengthening the participation of several Latin American institutions at CERN
- Recent efforts include the **LA-CoNGA physics**, an Erasmus+ Capacity Building program that created a common master program in HEP and Complex Systems for 8 universities in Colombia, Ecuador, Peru and Venezuela
- And its continuation with a **new Erasmus+ project called EL-BONGO**, which extends this effort to El Salvador, Honduras and Guatemala

LA-CoNGA physics International Network School 2022

Dec 5, 2022, 2:00 AM → Dec 7, 2022, 5:30 PM America/Bogota

Escuela de Física (Universidad del Magdalena)

Jose Ocariz (Université de Paris Cité), Reina Camacho (CERN)

Description LA-CoNGA physics Network School is an international event to share experiences and practices with students and instructors of the LA-CoNGA Physics project. In this event, the students will have the opportunity to discuss the results of their internships with classmates and experienced researchers from the institutions' members of the consortium.

LA-CoNGA physics (Latin-American alliance for Capacity building in Advanced physics) is an ERASMUS+ CBHE project aiming to support the modernization of university infrastructure and its pedagogical offer in advanced physics in four Latin-American countries: Colombia, Ecuador, Perú and Venezuela. This project is co-funded by the Education, Audiovisual and Culture Executive Agency of the European Commission. Our teaching and research network comprises three partner universities in Europe and eight in Latin America; high-level scientific partners (CEA, CERN, CNRS, DESY, ICTP), and several and two industrial partners.



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

Seminario especial
LA-CoNGA physics

Lunes 13 de septiembre de 2021
14:00 (Col, Ec, Pe), 15:00 Ve, 19:00 UTC
Transmisión en el canal de YouTube de LA-CoNGA physics

Steven Weinberg: El Modelo Estándar
Fernando Quevedo
Department of Applied Mathematics and Theoretical Physics (DAMTP)
University of Cambridge

#SeminariosLACoNGA #AuLACoNGA

¡Volvemos a sonar juntos!
<https://laconga.redclara.net/hackathon/>

hackathon
Datos Abiertos en América Latina 2023

Fase 1
Llamado a retos
22 Ago al 22 Sept

Fase 2
Inscripciones
01 sept al 01 oct

Fase 3
Hackathon
20 al 22 octubre

ICTP International Centre for Theoretical Physics
cedia
creative commons
CLARA

Flags of participating countries: Colombia, Argentina, Ecuador, Peru, Venezuela, Honduras, El Salvador, Guatemala.

EL BONGO™
Latin America Hub for Open Communities

Flags of participating countries: Ecuador, Argentina, Honduras, El Salvador, Guatemala, Colombia, Venezuela.

Creating equitable opportunities in the house (2/3)

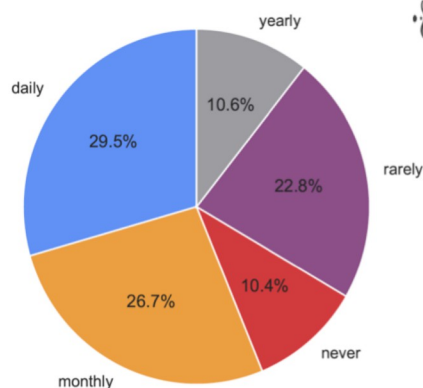
- Diversity efforts should not stop when people are through the door. To retain is as important as to recruit!
- Early career scientists for a and Diversity and inclusion committees and their workshops/training efforts
- Mentoring programs
- Code of conduct
- Frameworks: speakers committees, collaboration boards, etc

E.g. African School Physics mentoring program, [more info](#)

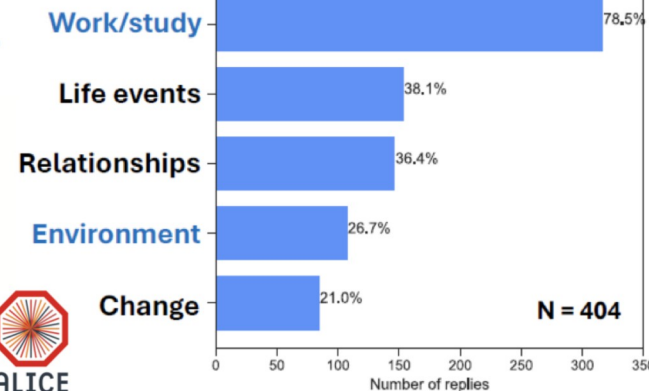


LHC Early Career Scientists Fora arranges the **Healthy Minds for Masterminds** - workshops during 2021-2023

Experience with Mental Health Challenges



Focus is on **well-being**.



Creating equitable opportunities in the house (3/3)

- In order to retain and sustain we also need to pay attention to:
 - Grants/funding stability/long term
 - Mentoring for mid-advanced careers
 - Review current policies (recruitment, promotion, funding) in search for hidden biased affecting minorities
 - And specially for minorities, avoid a surcharge of administrative/committees activities in order to “meet the quota”!
 - A backdrop of being included, and hence more accurately identifiable

Acknowledge diversity

- By collecting statistics!
 - And celebrate it...
- Inclusivity/cultural events to discuss about it
- Unconscious bias trainings
- ***Anything else? Tell us about other programs/initiatives you know or you want to push forward in your institutions or outside. I want to know more!***

Open Access

Brazilian physicists community diversity, equity, and inclusion: A first diagnostic

Celia Anteneodo, Carolina Brito, Alan Alves-Brito, Simone Silva Alexandre, Beatriz Nattrodt D'Avila, and Débora Peres Menezes

Phys. Rev. Phys. Educ. Res. **16**, 010136 – Published 5 June 2020

An article within the collection: [Examining racial diversity and identity in Physical Review Physics Education Research](#)

Article

References

Citing Articles (12)

PDF

HTML

Export Citation



ABSTRACT

We report the results of a survey applied to students and professionals in the area of physics in Brazil, pursuing to draw a portrait of the composition of this community in terms of the social markers of difference age, race, ethnicity, geographical origin, sex, gender, sexual orientation, and disabilities.



Diversity and inclusion panel at [COMHEP 2023](#), Universidad del Tolima, Colombia

Tackled at different levels

- Challenges for minorities in physics are present at different levels
 - Discussions and solutions must be implemented from institutional to individual level
 - Diversity and inclusion will just be a “thick the box” happy talk, unless measures are taken to challenge the ongoing structural inequalities
- Complex challenge, requires community involvement
 - Underrepresented groups alone cannot fix the problem of underrepresentation
 - Support everyone in your career / be considerate
 - Mentor others if you have the opportunity
 - Be an ally to those treated unfair by the system
 - Learn about others: each journey is different
- Thanks to Dilia Portillo, Carlos Sandoval, Carolina Mejías, Stefano Mattei, Sabrina Sacerdoti for the discussion in preparation for this talk and the material from LHC D&I and ECS fora at [ICHEP](#) and [LHCP 2024](#)
- Thanks for your attention! And looking forward to hearing from you, your journeys and any good practice you want to share

BACKUP