
(Brazilian) National Network of
High Energy Physics
*Rede Nacional de Física de Altas
Energias*

Marcelo G. Munhoz

Instituto de Física da Universidade de São Paulo

Member of the RENAFAE Technical-Scientific Committee

Brazilian National Network of High Energy Physics

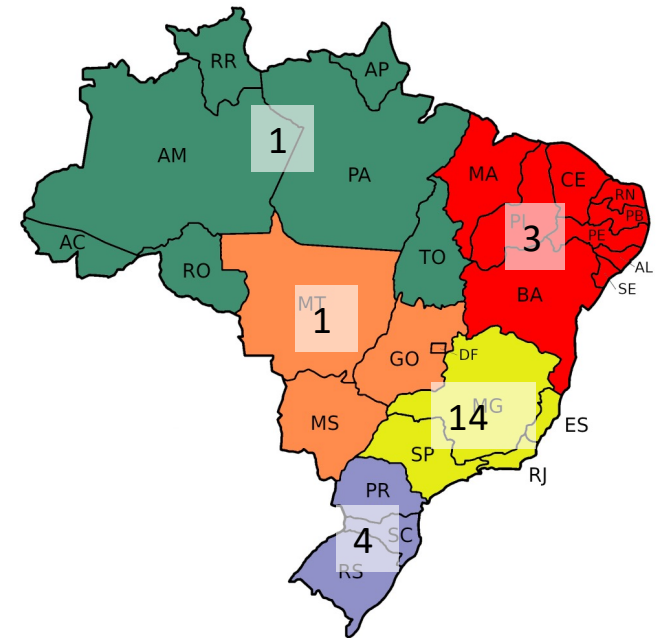
- RENAFAE (Rede Nacional de Física de Altas Energias, in Portuguese)
 - National Network officially created by the Brazilian Ministry of Science and Technology in 2008 in order to coordinate the national effort in High Energy Physics
 - Composed by the Brazilian physicists that work with High Energy Physics
 - Coordinated by a Technical-Scientific Committee
-

Brazilian National Network of High Energy Physics

- The Brazilian National Network of High Energy Physics has four main goals as part of its mission:
 - I. promote scientific and technological advances in the investigation of the properties of particles and their fundamental interactions in the country
 - II. coordinate the activities of groups in high energy physics and, in particular, activities associated with major international collaborations
 - III. consolidate and expand research in high energy physics, expanding the scientific and technical capacity needed to explore the benefits resulting from associated developments and their technological implications
 - IV. develop a program to mobilize companies located in Brazil to work on the development of instrumentation and software for international collaborations in high energy physics
-

RENAFAE community

- 23 institutions in 9 different Brazilian states (Brazil has 26 states in total)
- ~160 researchers/post-docs
- ~70 graduate students
- ~30 technical staff



RENAFAE community

- Accelerator physics
 - The four LHC large experiments (ALICE, ATLAS, CMS and LHCb)
 - ALPHA experiment at CERN
 - Cosmic Rays
 - Pierre Auger Observatory, Cherenkov Telescope Array (CTA), **SWGGO**
 - Neutrino experiments
 - DUNE/SBND, Angra, **CONNIE, JUNO**
-

Brazilian National Network of High Energy Physics

- The Brazilian National Network of High Energy Physics has four main goals as part of its mission:
 - I. **promote scientific and technological advances in the investigation of the properties of particles and their fundamental interactions in the country**
 - II. coordinate the activities of groups in high energy physics and, in particular, activities associated with major international collaborations
 - III. consolidate and expand research in high energy physics, expanding the scientific and technical capacity needed to explore the benefits resulting from associated developments and their technological implications
 - IV. develop a program to mobilize companies located in Brazil to work on the development of instrumentation and software for international collaborations in high energy physics
-

Fundraising

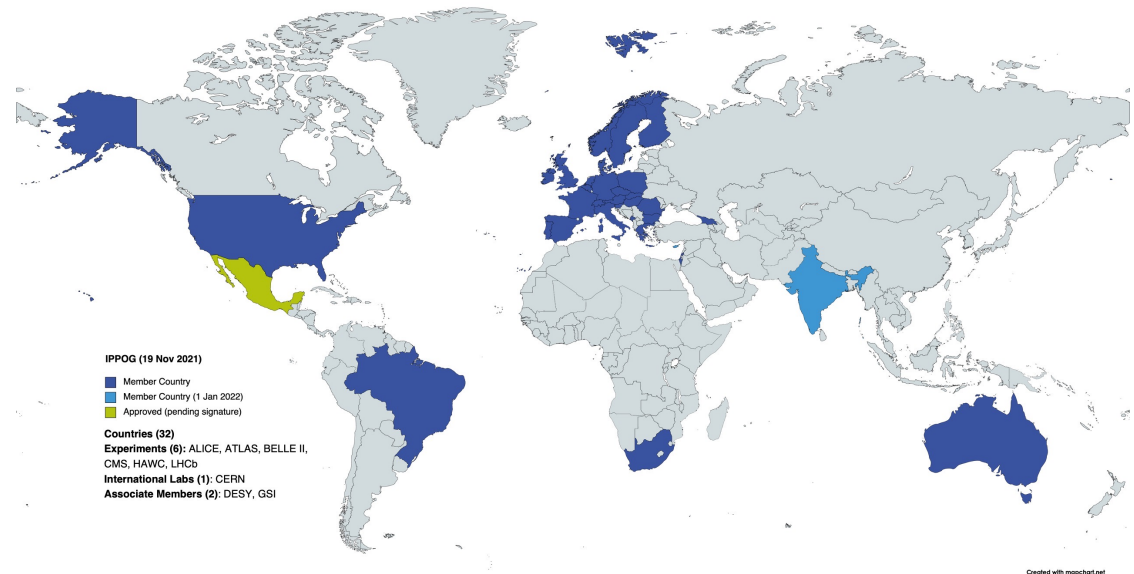
- RENAFAE has been fundamental to raise funds for the Maintenance and Operation fees of the international collaborations
- Main sources:
 - Ministry of Science, Technology and Innovation (MCTI)
 - Federal Funding Agencies: CNPq and FINEP
- ~ US\$600k per year

Outreach

- RENAFAE is responsible for the Brazilian participation in the **International Particle Physics Outreach Group (IPPOG)**
- Working Group of Particle Physicists, Science Education Experts and Teachers created
 - ~150 participants



International Particle
Physics Outreach Group



Brazilian National Network of High Energy Physics

- The Brazilian National Network of High Energy Physics has four main goals as part of its mission:
 - I. promote scientific and technological advances in the investigation of the properties of particles and their fundamental interactions in the country
 - II. **coordinate the activities of groups in high energy physics and, in particular, activities associated with major international collaborations**
 - III. consolidate and expand research in high energy physics, expanding the scientific and technical capacity needed to explore the benefits resulting from associated developments and their technological implications
 - IV. develop a program to mobilize companies located in Brazil to work on the development of instrumentation and software for international collaborations in high energy physics
-

Meetings and Representation

- Workshops
 - Organization of annual Workshops
 - The network brings together researches from different institutions and experiments in order to exchange knowledge, motivate collaborations and create opportunities
- Brazilian representation in different instances
 - CERN Resource Review Board

Workshop RENAF AE 2018

- 30-31 July, 2018
 - 161 participants
 - 65 contributions
 - <https://indico.cern.ch/event/719214/>
- 10 years of RENAF AE
 - Physics results
 - Instrumentation (detectors and electronics)
 - Computing (hardware and software)
 - Outreach



Brazilian National Network of High Energy Physics

- The Brazilian National Network of High Energy Physics has four main goals as part of its mission:
 - I. promote scientific and technological advances in the investigation of the properties of particles and their fundamental interactions in the country
 - II. coordinate the activities of groups in high energy physics and, in particular, activities associated with major international collaborations
 - III. **consolidate and expand research in high energy physics, expanding the scientific and technical capacity needed to explore the benefits resulting from associated developments and their technological implications**
 - IV. develop a program to mobilize companies located in Brazil to work on the development of instrumentation and software for international collaborations in high energy physics
-

Workshop RENAFAE 2021 (Online)

- 12-14 July, 2021
 - 109 Participants
 - 37 Contributions
 - <https://indico.ifsc.usp.br/event/6/>
 - Focused in instrumentation
 - Survey and discussion on current and future projects of Brazilian groups involving instrumentation and computing
- Detectors:
 - Gas Detectors
 - Scintillation Detectors
 - Semiconductor Detectors
 - Computing:
 - Machine Learning
 - Simulations
 - Signal and Information Processing

Brazilian National Network of High Energy Physics

- The Brazilian National Network of High Energy Physics has four main goals as part of its mission:
 - I. promote scientific and technological advances in the investigation of the properties of particles and their fundamental interactions in the country
 - II. coordinate the activities of groups in high energy physics and, in particular, activities associated with major international collaborations
 - III. consolidate and expand research in high energy physics, expanding the scientific and technical capacity needed to explore the benefits resulting from associated developments and their technological implications
 - IV. **develop a program to mobilize companies located in Brazil to work on the development of instrumentation and software for international collaborations in high energy physics**
-

Workshop “*Brazilian Association to CERN: Challenges and Opportunities*”

- August 19th, 2021
- Organized by the Ministry of International Relations
- **RENAFAE had an important role in this process and was invited to represent the high energy physics community in this meeting**
- Participation of several companies interested in providing products and services to CERN
 - An important step to initiate discussions with Brazilian companies in order to develop instrumentation and software for high energy physics experiments

Possible Sinergies with Inter-American Network of Networks of QCD Challenges

- RENAFEA supports Brazilian participation in the LHC heavy ion programs
- The network has great interest in training programs
- Brazilian groups interest in RHIC and EIC experiments can apply for support

Thank you!

Contact: munhoz@if.usp.br
