



Centro Latinoamericano de Física
Centre Latino-Américain de Physique
Centro Latino-Americano de Física



Organización de las Naciones Unidas
para la Educación, la Ciencia y la Cultura

CLAF-MCTI High-Level Meeting

**Opportunities for the Latin-American Participation and
Cooperation in Astro-particle Physics and the Project SWGO**

Pierre Auger Observatory, Mendoza



1995 UNESCO Paris – Site Selection (Argentina, Australia, South Africa)

Ronald Shellard (CBPF) and Carlos Escobar (UNICAMP): Brazil involvement in Auger (knowledge, human resources, and financing) only if site selected in Argentina.



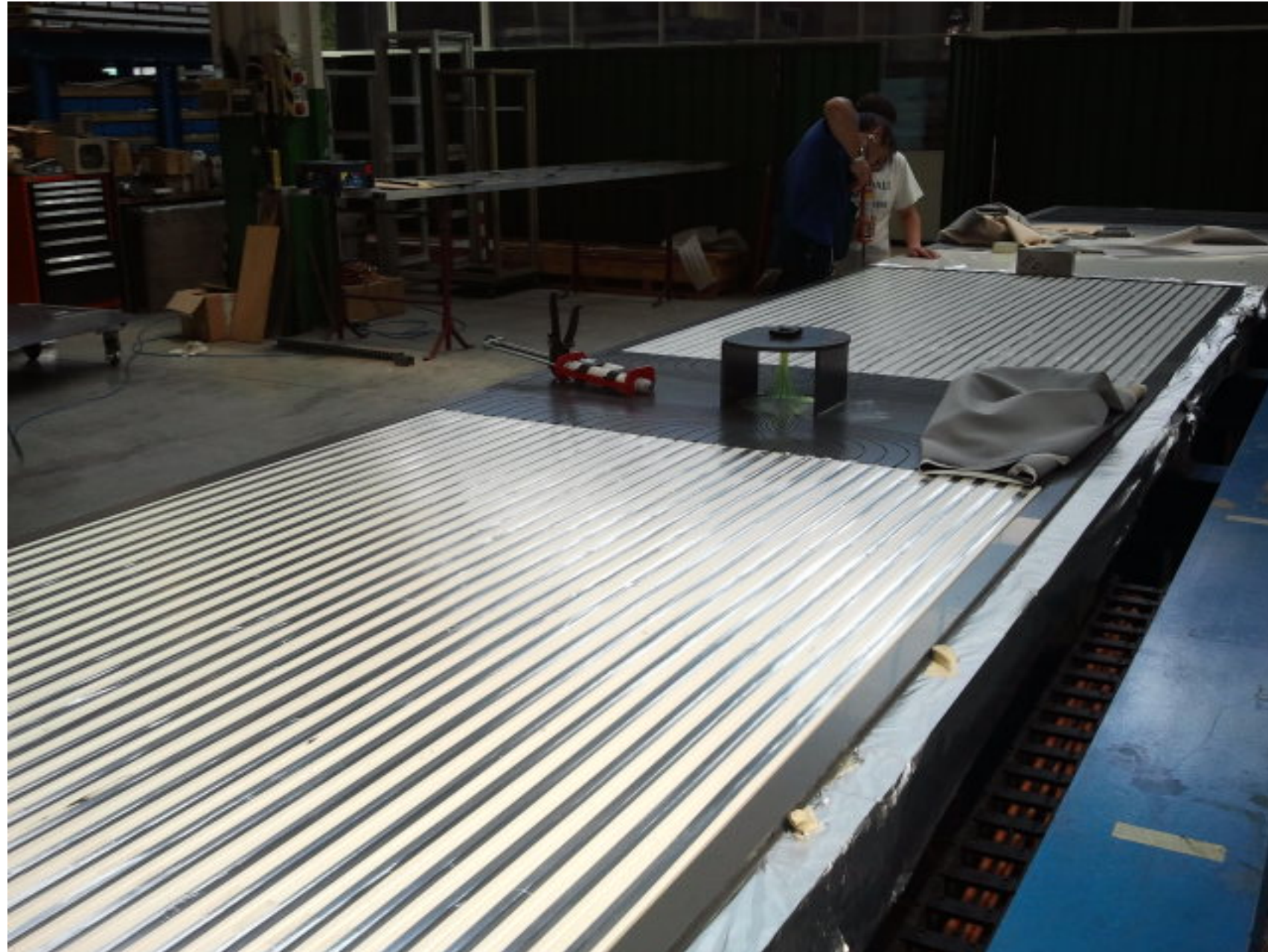
Mario Pimenta

Carola Dobrigkeit

2015 2nd Signature of International Agreement
10 more years due to Auger success. Main physics goals:
1.- New branch of science: Charged-Particle Astronomy
2.- Understand hadronic interaction at highest energies (they are wrong)

Latin America Collaboration Members: Argentina, Brazil, Colombia, Mexico, and Peru

Muon Detectors



Muon detectors:

- 1.- Useful for Auger and SWGO: identify primary cosmic ray.
- 2.- Useful for Dark Matter (ANDES), veto them (work performed with Chile - *Claudio Dib*). Towards a Muon Flux Inauguration ceremony with authorities and colleagues from both countries.

All three (Auger, SWGO, ANDES) with strong collaboration within Latin America.

Muon counters already developed and made.

SWGO: Clear and direct muon identification

- 1.- Might be used for calibration
- 2.- Might help towards significantly diminish water tank height (less water, transportation, commissioning...)

QUBIC OBSERVATORY AND ANDES LABORATORY



23/Nov/23 QUBIC Observatory Inauguration



Biocean Corridor for Regional Latin America Integration.
Commercial port in the Pacific ocean for Asia (China, India, Japan, ...)

1.700 m rock (shielding)

Working together with Chile

Technology: Cryogenic Quantum Sensors being developed for both projects with a Double Doctoral Engineering Degree program with KIT-Germany

Conclusions

Multi-Messenger studies

- 1.- High Energy Neutrinos (ANDES)
- 2.- High Energy Cosmic Rays (Auger)
- 3.- High Energy Gamma Rays (CTA, SWGO)

Cosmology

- 4.- Cosmic Background Radiation (QUBIC)
- 5.- Dark Matter (ANDES)

Joint Observatories with emphasis in developing innovative technologies.

Only feasible by large global international collaborations.

Latin America joint efforts in these hosted Observatories are of paramount importance.

**Let's keep and reinforce this track. Particular efforts in double doctoral degrees in
astrophysics.**