The panel “Latin America: achievements in the region and expectations from IUPAP” at the IUPAP100 Symposium

Convener: Silvina PONCE DAWSON

Panelists: Luis HUERTA / Arturo MARTI / Lilia MEZA MONTES / Rodrigo CAPAZ

The panel "Latin America: achievements in the region and expectations from IUPAP", which was held at the IUPAP Centennial Symposium, included the participation of the Past Chair of the Ibero-American Association of Physical Societies, Arturo Martí, the Director of the Latin American Center for Physics and President of the Chilean Physical Society, Luis Huerta, the Chair of the IUPAP Working Group on Women in Physics and Past Chair of the Network of Science, Technology and Gender, Lilia Meza Montes and the Vice-president of the Brazilian Physical Society and Director of LNNano/CNPEM, Rodrigo Capaz.

Silvina Ponce Dawson, IUPAP’s President Designate, was the panel’s convener. Arturo Martí introduced the Ibero-American Association of Physical Societies (FEIASOFI), whose current structure was established in 2005 and which now includes the physical societies of nineteen Latin American countries, Spain, and Portugal. FEIASOFI’s president, María Sánchez, was connected via Zoom. He explained that the presidents of all its member physical societies participate in the General Assembly of the Association which is held once every two years. FEIASOFI collaborates with several other institutions and societies such as the Latin American Center for Physics, the American and the European Physical Societies, and IUPAP, of which it is an official observer. It also runs some outreach programs, in particular the University Physics Olympiad of Latin America and the Caribbean (OLUF). Martí then gave a brief overview of the situation of physics in Latin America which he compared with a turbulence: it is out of equilibrium, has a wide range of spatio-temporal scales and still is an open problem. Leaving apart the metaphors, physics is very heterogenous across the region with some countries that have large and well-established communities of over a thousand members and some very prestigious institutions and others that barely have tens of physicists or almost no physics at all. Most physicists in the region work at academic institutions. There is a current trend among the youngest generations of physicists, however, of going into science data in the private sector that might eventually revert this situation. Another feature that has characterized physics practice in the region is the strong fluctuations in science funding that make long-term projects very difficult to pursue and potentiates the difficulties to retain highly qualified human resources that emigrate within or outside the region.

Luis Huerta gave a brief account of the Latin American Center for Physics (CLAF) which, led by the vision of Juan José Giambiagi of Argentina, José Leite Lopes of Brazil, and Marcos Moshinsky of Mexico, was

created in 1962 under the auspices of UNESCO (https://atom.archives.unesco.org/latin-american-centre-for-physics). Taking CERN as a model, CLAF's constitution and functioning is based on an inter-governmental agreement. CLAF's aims are to foster regional cooperation in promoting physics and to link physics research to the economic and social development of Latin America and the Caribbean. At the time of its creation, there were about 80-90 scientists per million inhabitants in the region, 7-8 of whom were physicists, i.e., about 1300-1400. Women constituted less than 10% of this total. Nowadays there are about 45 physicists per million inhabitants (~25,000) in the region, 20% of whom are women, with huge differences between countries. Physicists in Latin America and the Caribbean are about 2% of the worldwide physics community while the number of people living in the region is about 7% of the total population of the World. Huerta also mentioned how the political environment in the various countries of the region affected the evolution of the Center. CLAF's current lines of action include contributing to the political recognition of science importance for national development, to the elaboration of a global and integrated vision of its practice and to reducing the existing imbalance in scientific development across the region. It also seeks to form a solid an interconnected regional scientific community that might help develop an autonomous technology. Huerta finally mentioned some of the main research facilities related to physics in the region, among them, the synchrotron Sirius in Brazil, the HAWC Observatory in Mexico, the Pierre Auger Observatory in Argentina, several telescopes in Chile (Cerenkov array, Wide-field Gamma Observatory, Cerro Tololo and La Silla) and the planned Andes Laboratory that is planned to be included in the Agua Negra tunnel that will connect Argentina and Chile.

Lilia Meza Montes talked about the huge impact that IUPAP's initiatives to address the gender gap in physics, particularly the actions of its Working Group on Women in Physics (WG5), had in Latin America. They served establish a very active network of women physicists that very soon partnered up with scientists of other STEM disciplines and of social sciences as well. The pursuits of WG5, especially, the International Conferences on Women in Physics (ICWIPs) that are organized triennially, inspired many related actions in the region. National and regional activities started to be carried out immediately after the first ICWIP, physics communities eventually became aware of the specific problems faced by women and physical societies began to be more open to address gender issues. Currently, almost all national physical societies of the region have gender diversity commissions. Multidisciplinary networks were established and protocols to prevent and address sexual harassment were approved in academic and scientific institutions. Meza-Montes then gave a brief account of some of the activities in which she was directly involved: an interdisciplinary school for graduate students which included networking sessions where some personal issues were discussed, the Workshops on Professional Skills with a Gender Perspective that have been carried out since 2014 and the strong participation in the Gender Gap in Science Project which, among other things, resulted in the writing of a book documenting the regional activities on the subject and in having received over 20% more responses to the Global Survey of Scientists from Latin America and the Caribbean than originally expected. These have efforts have also led to the creation of the organization, Witral Ciencia, which mission is to promote equality, inclusion and gender equity in STEM; to foster meetings and discussions that enhance social, economic and cultural changes; and to allow intercultural participation and leadership in Latin American science. In spite of the great progress, Meza-Montes also pointed out that there are several tasks that still need to be done: reaching out to countries without existing teams, motivating more male colleagues to participate in gender-related activities, getting support of local associations, making IUPAP resolutions reach national communities of the region, having more funding to carry out the activities.

Rodrigo Capaz first gave a brief account of physics history in Brazil, which can be traced back to 1851 when the first physics paper of the country was published in Comptes Rendus. In 1916 the Brazilian Academy of Sciences was created, which became IUPAP member in 1951. The Brazilian Physical Society (SBF) was created in 1966. SBF now has 2000 members, 12 area commissions, 13 annual meetings and

schools, 4 annual prizes and is also in charge of organizing the national physics Olympiads. In 2022 Brazil became an associate member of CERN. Capaz then proceeded to describe the National Center for Research in Energy and Materials (CNPEM) which holds four national laboratories that are, to some extent, centers at a smaller scale: National Laboratory of Synchrotron Light (LNLS), National Laboratory of Biosciences (LNbio, https://lnbio.cnpem.br/), National Laboratory of Bio-renewables (LNBR), and National Laboratory of Nanotechnology (LNNano). These laboratories work synergistically in the CNPEM campus which, located in Campinas near Sao Paulo city, holds open facilities and in-house research. CNPEM also provides support for technological innovation and carries out educational and dissemination activities. CNPEM is host to one of the few most advanced synchrotron facilities of the world, Sirius. Sirius currently has eight beam lines, named after Brazilian fauna and flora specimens, that are at different stages of development. Some of these lines are at the commissioning stage, three are being installed, two are being assembled and one is projected to be completed by the end of the first phase. Eight more lines are expected to be added during the second phase. The first paper based on research done in Sirius was published in 2021. Capaz mentioned a very challenging new project: building the first maximum biological contention laboratory (BSL 4) to be connected to a synchrotron facility. Once finished, three beamlines will go through this biolab. He also pointed out the great impact that the establishment of Sirius had on Brazilian industry. A great fraction of the project and equipment (about 86%) was developed in Brazil, for example, the x-ray detectors were made by the Brazilian company Pi Tec. As mentioned by other panelists, this is not very common in the region, and it is a very important that other initiatives with this impact be carried out in the future. This issue was raised during the subsequent discussion by Yves Petroff, who was director of LNLS in 2018-2020. In particular, he asked about the impact of large observatories and telescopes on local companies and development. Silvina Ponce Dawson briefly described the great impact that the establishment of the Pierre Auger Observatory had on industry and on its site local community. Luis Huerta told that the first large telescopes that were installed in Chile only allocated 10% of the observation time to scientists of the country. Nowadays the agreements that are signed when this type of facilities are established, also include the transfer of technology transfer (at least, for maintenance).

The discussion that followed the expositions by the panelists raised some questions. Michel Spiro wondered whether using the name “Latin America” did not exclude the population of native American descendants. Changing a name that has been used for a very long time is very difficult. However, it is very important to think of ways to make science practice more inclusive of the very diverse population of the region. The foreseen plans of IUPAP to advance with actions to increase inclusiveness in multiple dimensions will certainly be of help in this regard. Another participant asked how the most developed physics communities of the region reached out to the least developed ones. This is another issue with which IUPAP can help, particularly by funding workshops and activities in countries with less developed physics communities and engaging them with our Union through the new type of territorial membership that is currently being discussed. Promoting projects that seek to build research communities, such as the Lightsources for Africa, the Americas, Asia, Middle East and Pacific (LAAMP) project that IUPAP supports together with IUCr and ICTP, is another way in which our union can be of help. Sirius is a superb facility that is still not part of LAAMP. Hopefully this situation will soon be reverted thanks to the conversations that the Latin American panel at the IUPAP100 Symposium nurtured.

Silvina Ponce Dawson, IUPAP President Designate