



The National Institute for Science and Technology CERN-Brasil

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National Institutes for Science and Technology



- Program from the Brazilian national funding agency CNPq created in 2008
 - Institutos Nacionais de Ciência e Tecnologia (INCT)
- *The National Institutes will be formed from a host institution, characterized by the excellence of its scientific and/or technological production, high qualification in the training of human resources and with the capacity to leverage funds from other sources, and by a set of laboratories or associated groups from other institutions, articulated in the form of **scientific-technological networks** that must include researchers from groups on new university campuses, and/or in institutions in less favored regions.*

INCT CERN-Brasil



- Approved in December 2022, first funds released in June 2023, kick-off meeting in September 25th 2023
 - <https://indico.cern.ch/event/1310815/>
- **Coordinator: Ignácio Bediaga (LHCb, CBPF)**
- Deputy Coordinator: Marcelo Munhoz (ALICE, USP)
- Membership:
 - Collaborations: ALPHA, ALICE, ATLAS, CMS and LHCb
 - Members: 100 researchers and 56 master degree and PhD students (and growing)
- Webpage: <https://portal.if.usp.br/cernbr/pt-br>

INCT CERN-Brasil



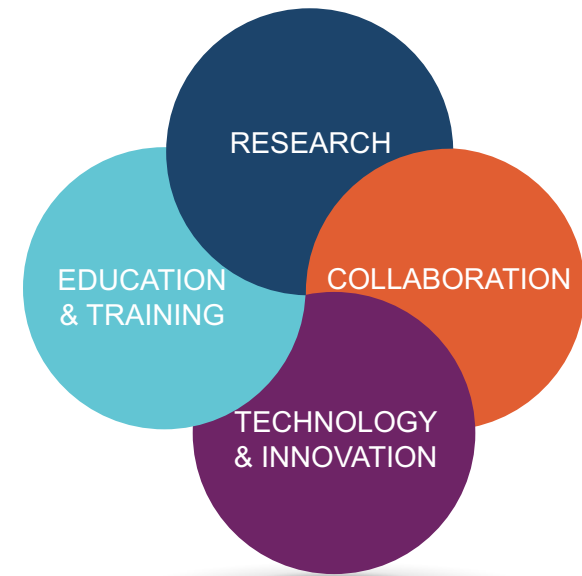
- Membership: 19 institutions of several Brazilian regions



INCT CERN-Brasil Objectives



- Enhance cross-collaboration among researchers from different CERN experiments and institutions in thematic axes involving:
 - Data analysis
 - Construction of new detectors
 - High-performance computing
 - Software development
 - Training of new generations
 - Scientific dissemination



INCT CERN-Brasil Objectives



- Encourage the participation of Brazilian groups in technological development in a coordinated manner, seeking to enhance synergies between institutions and experiments that have common technological goals
- Bring these technological developments closer to the national industry
 - The Brazilian association with CERN creates favorable conditions for this approach, which should yield promising results for the country

INCT CERN-Brasil Objectives



- Promote training activities in the various aspects of the project (both scientific and technological)
- Promote activities to disseminate this knowledge to elementary schools and the general public through partnerships with the International Particle Physics Outreach Group (IPPOG), schools, and teachers

INCT CERN-Brasil Methodology



- The governance of INCT CERN-Brasil is the responsibility of the coordinator, the deputy coordinator, and the Management Committee
 - This Committee is composed of the main leaders of the national High Energy Physics community conducting research at CERN, including members of the Scientific Technical Committee of RENAFEA who participate in collaborations at this laboratory

INCT CERN-Brasil Methodology



• Management Committee

- | | | |
|------------------------------|-------|---------|
| • CARLA GOBEL | LHCB | PUC-RIO |
| • CLAUDIO LENZ | ALPHA | UFRJ |
| • GILVAN AUGUSTO ALVES | CMS | CBPF |
| • JOSE MANOEL SEIXAS | ATLAS | UFRJ |
| • LEANDRO SALAZAR DE PAULA | LHCb | UFRJ |
| • LUIZ MARTINS MUNDIM | CMS | UERJ |
| • MARCO AURELIO LISBOA LEITE | ATLAS | USP |
| • MARIA BEATRIZ GAY DUCATI | ALICE | UFRGS |
| • SANDRA DOS SANTOS PADULA | CMS | UNESP |
| • SERGIO NOVAES | CMS | UNESP |

INCT CERN-Brasil Methodology



- To emphasize the cross-disciplinary nature of its actions, Working Groups (WG) were created focusing in the instrumentation technologies:
 - WG-1 Gaseous Detectors
 - WG-2 Semiconductor Detectors
 - WG-3 Photonic Conversion Detectors
 - WG-4 Electronics
 - WG-5 Computational Infrastructure
 - WG-6 Associated Technologies (lasers, magnets, etc.)
 - WG-7 Advanced Data Analysis Techniques
 - WG-8 Scientific Dissemination

INCT CERN-Brasil Methodology



- The coordinators of the WG form an **Executive Committee**, whose main objectives are the exchange of information among the WGs and the development of joint proposals
 - WG-1 Gaseous Detector: Hélio Nogima (UERJ) e Tiago Silva (USP)
 - WG-2 Semiconductor Detectors: Irina Nasteva (UFRJ) e Marco Leite (USP)
 - WG-3 Photonic Conversion Detectors: André Massafferri (CBPF) e Antonio Vilela (UERJ)
 - WG-4 Electronics: Marco Bregant (USP) e Augusto Cerqueira (UFJF)
 - WG-5 Computacional Infraestrutura: Rogerio Iope (UNESP) e Jaime (CBPF)
 - WG-6 Associated Technologies: Daniel Miranda (UFRJ) e Natanael Moura Junior (UFRJ)
 - WG-7 Advanced Data Analysis Techniques: Gustavo Gil (UFRGS) e Thiago Tomei (UNESP)
 - WG-8 Scientific Dissemination: Graciella Watanabe (UFABC) e Márcia Begalli (UERJ)

INCT CERN-Brasil Timeline



- Focus on the development of themes related to R&D of detectors and software from 2022 to 2027
- Partially linked to the next phase of LHC operation (HL-LHC)
 - upgrade programs of the ATLAS and CMS experiments for Phase-II of the LHC (starting in 2029)
 - upgrades of the ALICE and LHCb experiments (Phase-IIb) scheduled for Run 5 of the LHC (starting in 2035)

INCT CERN-Brasil

Costs



- Local infrastructure to support activities of development and construction of equipment for the LHC experiments upgrade program, demanding investments in laboratories, training and qualification of local personnel
- Contribution to data processing conducted from computational facilities in Brazilian universities and research centers
- Shared payment of annual operating and maintenance expenses for the experiments

INCT CERN-Brasil

Costs



- Regular travel for researchers, students, and technicians, demanded for participation in the assembly and operation of experiments at CERN, as well as in-person meetings that are crucial for the creative and productive scientific process
- Scholarships for graduate students meant for internships at CERN or partner international institutions, essential for the development and execution of their research projects
- Up to two-year scholarships for staying at CERN or at another laboratory abroad, allowing researchers to take on leadership roles in an experiment

INCT CERN-Brasil

Current Status



- II Workshop INCT CERN-Brasil
 - <https://indico.cern.ch/event/1375222/>
- Relatório GT-8 (Divulgação Científica)
- Relatório GT-7 (Técnicas Avançadas de Análise de Dados)
- Relatório GT-6 (Tecnologias Associadas)
- Relatório GT-5 (Infraestrutura Computacional)
- Relatório GT-2 (Detectores Semicondutores)
- Relatório GT-3 (Detectores de Conversão Fotônica)
- Relatório GT-4 (Eletrônica)
- Relatório ALPHA
- Relatório ALICE
- Relatório ATLAS
- Relatório CMS
- Relatório LHCb
- Balanço Geral e Próximos Passos

INCT CERN-Brasil

Current Status



- Common electronics project
 - Gaseous Detectors (WG-1), Semiconductor Detectors (WG-2), Photonic Conversion Detectors (WG-3), Electronics (WG-4)
 - Possible involvement of Brazilian industry
- Common semiconductor sensors project (WG-2)
- First prototype of a cloud computing facility (WG-5)
- Data analysis school (WG-7)
 - SPRACE from 4th to 8th of November, <https://indico.cern.ch/e/1escolainct>
- Creation of an traveling exhibition about high energy physics and the Brazilian participation in CERN (WG-8)

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Expected Challenges



- Improve the synergy among institutions and experiments in Brazil
- Contribute to the association of Brazil to CERN to bring benefits to the country
- Discuss with funding agencies the demands of the Brazilian participation in CERN
 - It has particularities because of its highly internationalized character, which are not contemplated by the current programs of the funding agencies
 - It is needed specific financing lines which contemplates long duration projects with regular and predictable disbursement



Thank you!