PROCEEDINGS OF SCIENCE

Physics Beyond Colliders Communications Strategy

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We present the Physics Beyond Colliders Initiative (PBC) communications strategy. Launched in 2016 and confirmed by the Update of the European Strategy of Particle Physics, PBC aims to exploit the scientific potential of CERN's accelerator complex and technical infrastructure, as well as CERN's expertise in accelerator and detector science and technology. An important aspect to this is the communication of the activities to a broad range of stakeholders, from the general public to the specialized physics community, also including funding agencies. For that, various communication channels are used and new ones explored, adapted to the target audience. These activities do not only cover the ongoing PBC work but also highlight some of the success stories coming out of previous PBC efforts.

ICHEP,
17 - 24 July, 2024
Prague Congress Centre, Prague, Czech Republic

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PoS(ICHEP2024)1155

Physics Beyond Colliders

Physics Beyond Colliders (PBC) was launched in 2016 and confirmed by the Update of the European Strategy of Particle Physics. The initiative aims to fully exploit the scientific potential of CERN's accelerator complex, technical infrastructure, and expertise in accelerator and detector science & technology, with the goal to diversify and extend CERN's scientific landscape at the precision and intensity frontiers with its rich fixed-target programme. As such it complements ongoing collider-based research at the Large Hadron Collider (LHC).
The diverse PBC projects, ranging from quantum chromodynamics to Beyond the Standard Model searches and, in particular, searches for feebly interacting particles, complement the goals of the Laboratory's main collider experiments by targeting fundamental physics questions. To date, flagship projects emerging from PBC include the NA64 experiment [1–3], which is searching for light dark matter, and the ECN3 high-intensity facility [4] in CERN's North Area. Most of the projects are located at the Super Proton Synchrotron (SPS) as part of the LHC injector complex, while others, among them FASER [5] and SND [6], are located at the LHC itself. Projects within PBC benefit not only from CERN's infrastructure, but also from its expertise as some of them are located outside CERN, such as BabyIAXO, the demonstrator of international axion observatory IAXO [7].

Communications Strategy

Central to the PBC is that its efforts are based on a wide range of stakeholders. Therefore, a strong and bespoke communications strategy, which engages different audiences ranging from funding agencies to the general public and ensures the dissemination of PBC's and its projects' potential, is essential. This strategy aims to highlight PBC's role in diversifying and extending CERN's research activities. This communication strategy is based on CERN's broader communication approach, maintaining consistency in messaging while adapting to various stakeholders. By aligning with CERN's established strategy, PBC benefits from a coherent framework that emphasizes the initiative's core messages across all communication channels. Although the focus depends on the specific audience, the scientific community, funding agencies, or the general public, the key messages remain unified. This guarantees that PBC's goals, achievements, and impact are communicated clearly and effectively. Articles are the primary channel for conveying these messages, offering a flexible and in-depth medium to reach all three groups.

Key messages include:
• Big discovery potential at the precision and intensity frontiers
• PBC activities complement those at the LHC

Target audiences

The most important target audiences are identified as the physics community, the general public and funding agencies.
Physicists drive the science behind the projects by bringing in a fresh perspective, increase the collaboration size, and contribute to technological developments for the experiments.

The general public is important as the demystification of science fosters a positive environment for science. In addition, future generation of scientists and politicians can already be engaged by sparking their curiosity. This will secure in the long term the political backing to explore the frontiers of physics.
Providing financial resources to realise the projects is vital for them, as many of them will start operating after the LHC Long Shutdown 3. Thus, effectively communicating the scientific value helps to secure the long-term investments, which will also secure CERN's leading role.

Funding agencies

The overarching goal is to attract and convince funding agencies to invest in fundamental physics research and in particular the PBC projects. This is done by underlining the technologies used to obtain fundamental results in particle physics. Not only the physics potential, but also the innovation potential of these projects is emphasised. Thanks to the small size of the experiments, early-career researchers have the opportunity to quickly assume visible responsibility and make valuable contributions to the progress and research programme. It is highlighted how countries and international funding agencies are part of world-class research and invest in STEM skills with these agile, cost-effective projects that can be realised on a short timescale. In addition, PBC projects create new EU-driven projects with their grant-winning applications.

Physics Community

It is vital to show and share both the milestones, scientific breakthroughs, and the success stories of the different projects within the high-energy physics community. Given the small size of the collaborations, plenty of career developments are possible, especially for Early Career Researchers. Therefore, outreach activities target science magazines, such as the CERN Courier, and or Newsletters, such as the CERN EP-Newsletter and the Newsletter of the European Physical Society. In addition, articles are distributed on the PBC webpage and adverted to home.cern, a focal point to attract and to engage more people.
For the individual projects themselves, bespoke communication strategies have been developed, for instance by creating short brochures, images of the project, and short videos that are distributed via the projects's homepages, social-media channels of both project and individual collaboration members, and in scientific presentations.
This strategy aims to support PBC working groups, as well. An example are the virtual tours that have been created for the Conventional Beams Working group taking care of beam and feasibility studies. In addition, this working group oversees the experimental areas, in which the test beam for the users take place. As a first step, these tours have been created specifically for projects within PBC who took test beam during their R&D phase at CERN, which can now be extended to virtual visits for researchers interested in joining the experiments.
Virtual tours further help to explain the programmes to CERN visitors, when an access to the facility is not possible.

General Public

To strengthen the image of science in the general public, as well as reaching members of funding agencies, it is important to cover the research of the projects over a broad range.

The two main channels to reach the interest of the general public go via the main CERN Channels: home.cern and the CERN Bulletin. While home.cern is the official homepage of the Organisation, the CERN Bulletin is the internal newsletter for members of personnel including non-physicists. Throughout these two channels, a constant stream of articles is shared worldwide and distributed to other outlets and newsletters.
Another medium used are videos comprising timelapses of the installation of an experiment, or short video interviews by the collaboration about their experiment and their role therein, adding a human story when the researchers share their fascination with the world.

Success stories

Each project can have a significant impact on the physics landscape. This potential is underlined by two examples of success stories that have been launched during the first PBC phase: The AMBER experiment [8] reproduced components of cosmic rays. The publication of the results was accompanied by articles on home.cern [9] and the EP-Newsletter [10] as well as short videos and a flight-over the experiment [11]. In addition, images for a virtual tour have been taken, which will allow visitors to learn more about the experiment during beam time, when the experiment is not accessible. Another example is the NA64 experiment [3], where a timelapse documented the set up of their experiment and videos featuring their Early Career Researchers who explain the different detectors. The same has been done for athe ENUBET [12] collaboration during their test-beam campaign in August 2024 as well as for the NA61(+) experiment [13] in September 2024.

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