

The CERN PBC study

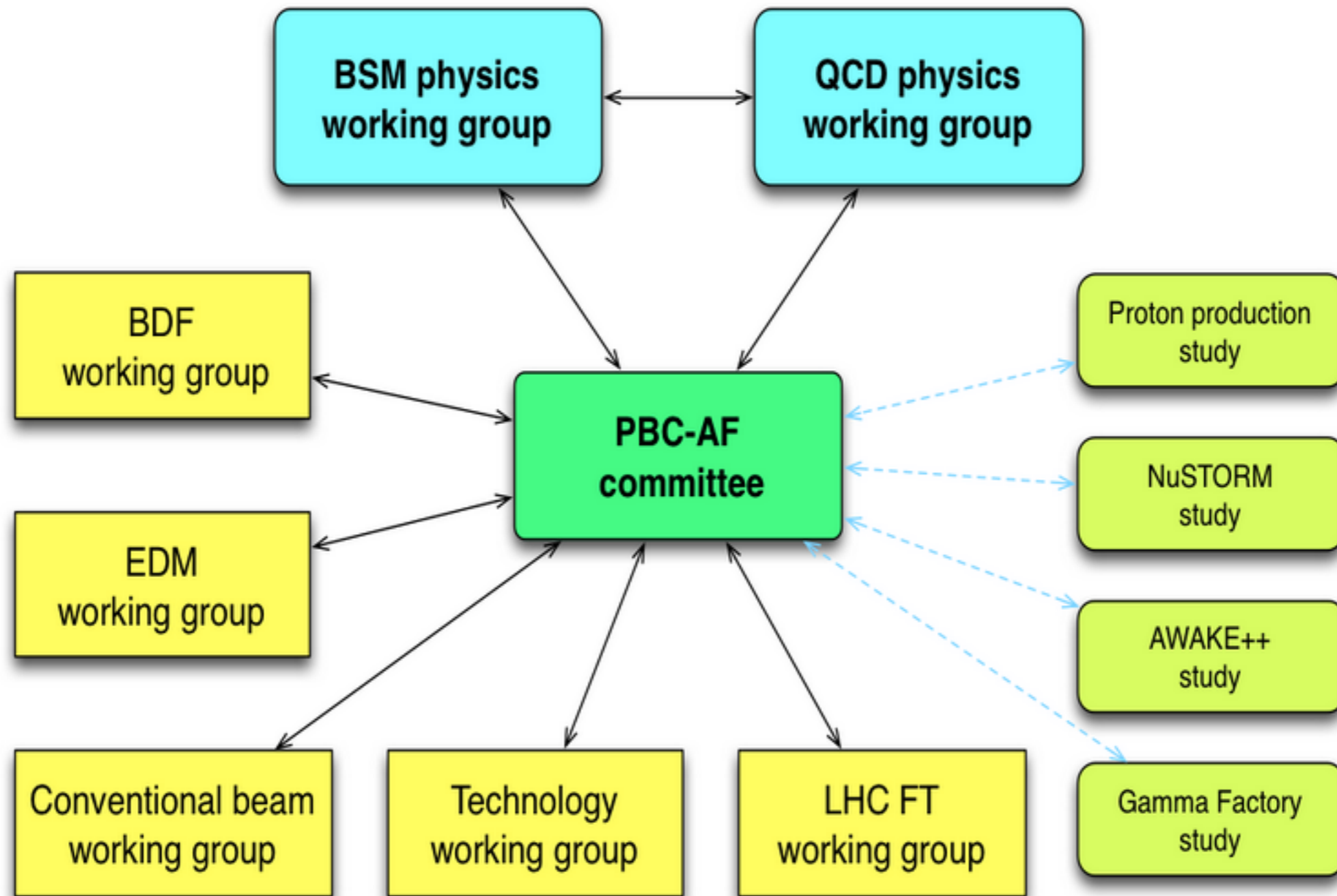
**M. Diehl for the QCD Working Group Conveners
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CERN Study “Physics Beyond Colliders”

- started in 2016 at request of CERN management
- aim:
 - mid- to long-term overview/perspective of CERN non-collider activities
 - input for next European Strategy Update
- kickoff meeting in Sept 2016
first plenary meeting March 2017
next plenary meeting 21-22 Nov 2017 at CERN

more information on: <http://pbc.web.cern.ch>

Structure



Overall coordinators: Joerg Jaeckel, Mike Lamont, Claude Vallée

Mandate of the "Physics Beyond Colliders" Study Group

CERN Management wishes to launch an exploratory study aimed at exploiting the full scientific potential of its accelerator complex and other scientific infrastructure through projects complementary to the LHC and HL-LHC and to possible future colliders (HE-LHC, CLIC, FCC). These projects would target fundamental physics questions that are similar in spirit to those addressed by high-energy colliders, but that require different types of beams and experiments.

This study should provide input for the future of CERN's scientific diversity programme, which today consists of several facilities and experiments at the Booster, PS and SPS, over the period until ~2040. Complementarity with similar initiatives elsewhere in the world should be sought, so as to optimize the resources of the discipline globally, create synergies with other laboratories and institutions, and attract the international community.

Scientific goal

The main goal of the Study Group is to explore the opportunities offered by the CERN accelerator complex to address some of today's outstanding questions in particle physics through experiments complementary to high-energy colliders and other initiatives in the world. These experiments would typically: *(i)* enrich and diversify the CERN scientific program, *(ii)* exploit the unique opportunities offered by CERN's accelerator complex and scientific infrastructure, *(iii)* complement the laboratory's collider programme (LHC, HL-LHC and possible future colliders). Examples of physics objectives include searches for rare processes and very-weakly interacting particles, measurements of electric dipole moments, etc.

Deliverables: draft structure (to be finalized by ~ end of Sept 2017)

STRUCTURE OF PBC DELIVERABLES

The following table describes the overall spirit, content and relationship of the documents expected at the term of the PBC study. The PBC working groups are in charge of defining the detailed structure and content of their own deliverables along these lines.

DOCUMENT	EDITORS	AUTHORS	CONTENT
Main (30-50 pages)	PBC coordinators	PBC WGs	Highlights of the physics case of the proposed PBC experiments at CERN, and how they can address it: <i>physics orientations in the worldwide landscape, uniqueness of CERN context, compatibility of projects, technical feasibility, timelines and financial implications.</i> The content of this document will be supported by the detailed information provided in the ancillary documents listed hereafter.
QCD context	QCD WG conveners	QCD WG + possible externals as appropriate	Worldwide QCD physics landscape with a focus on how the proposed PBC projects fit in term of theoretical motivation and experimental sensitivity: <i>QCD fundamental open questions and measurements of interest for other domains.</i>
Experiments CDS/EOI/LOI /PROPOSAL...	Proponent Collaborations	Proponent Collaborations	Documents from the projects proponents describing their individual experiments: <i>physics motivation; expected sensitivity; detector layout; estimated timeline and cost; Collaboration structure. Level of details to be matched to the maturity of the projects.</i> Documents expected from NA62++, NA64++, KLEVER, SHiP, IAXO, ALPS-III, COMPASS++, MUE, DIRAC++, NA60++, NA61++, AFTER, LHCb-FT, ALICE-FT NB: these documents stay under responsibility of the Collaborations and can be the basis for possible future consideration of the projects by the SPSC and LHCC.