Physics Beyond Colliders 3rd Annual Workshop
CERN, January 16-17, 2019

J. Jäckel, M. Lamont and C. Vallée

INTRODUCTION TO THE WORKSHOP: PBC Events/Organisation/Deliverables

PBC: a Study Group mandated by the CERN Management to prepare the next European HEP strategy update (2019-20)

Excerpt from the PBC mandate:

"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."

Time scale: next 2 decades

pbc.web.cern.ch

NB: PBC mandate recently extended up to May 2020 to support the EPPSU

PBC EVENTS IN THE PAST 2 YEARS

PBC KICK-OFF WORKSHOP, CERN, September 2016

Call for abstracts → 20 selected for presentation

1st GENERAL WORKING GROUP MEETING, CERN, March 2017

Identification of main issues to be studied

2nd PBC WORKSHOP, CERN, November 2017

Working groups project reports

New call for abstracts → 7 selected for presentation

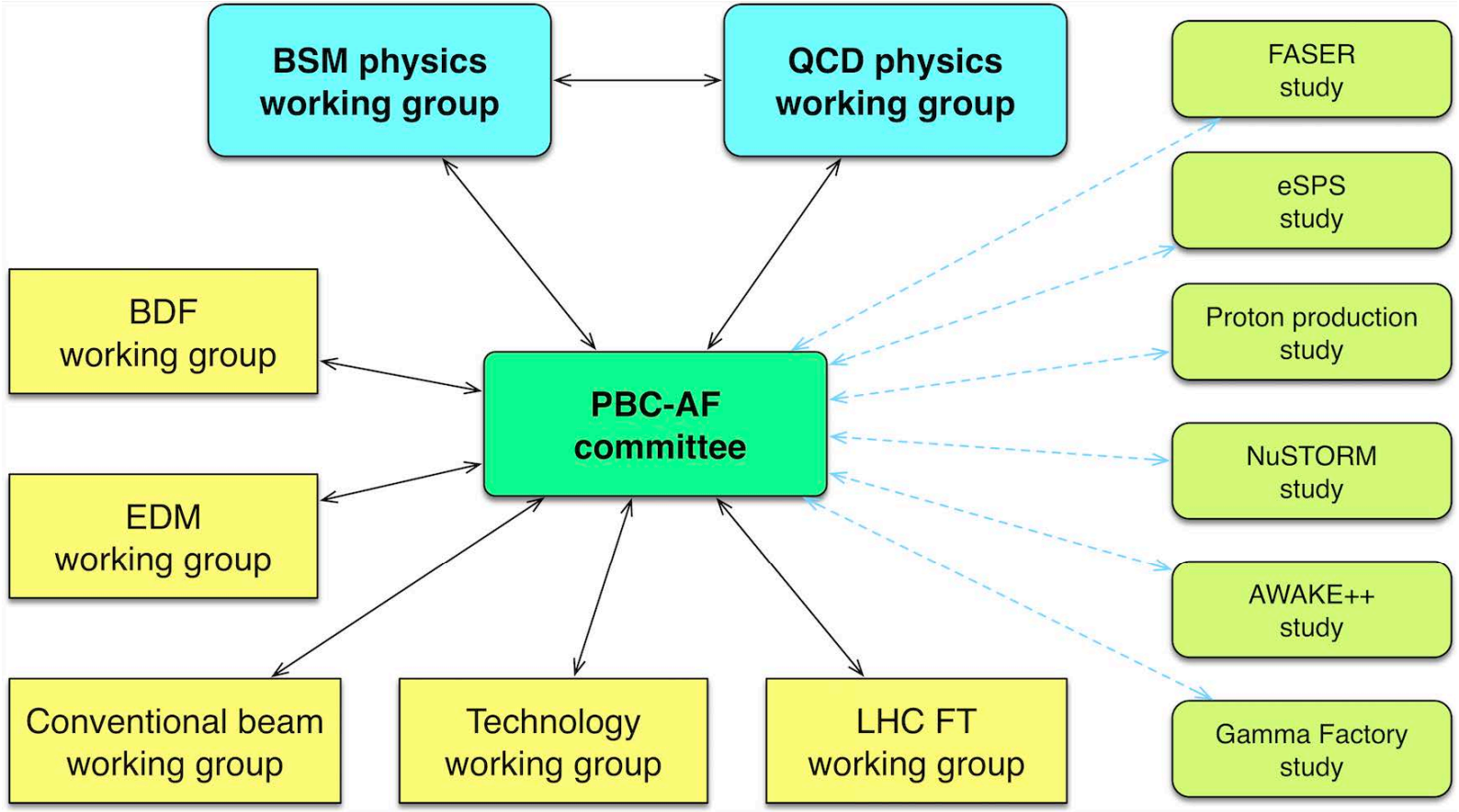
2nd GENERAL WORKING GROUP MEETING, CERN, June 2018

Status of studies for PBC deliverables

3rd PBC WORKSHOP: CERN, January 16-17, 2019

Summary of inputs to EPPSU and survey of future studies

PBC WORKING GROUP STRUCTURE

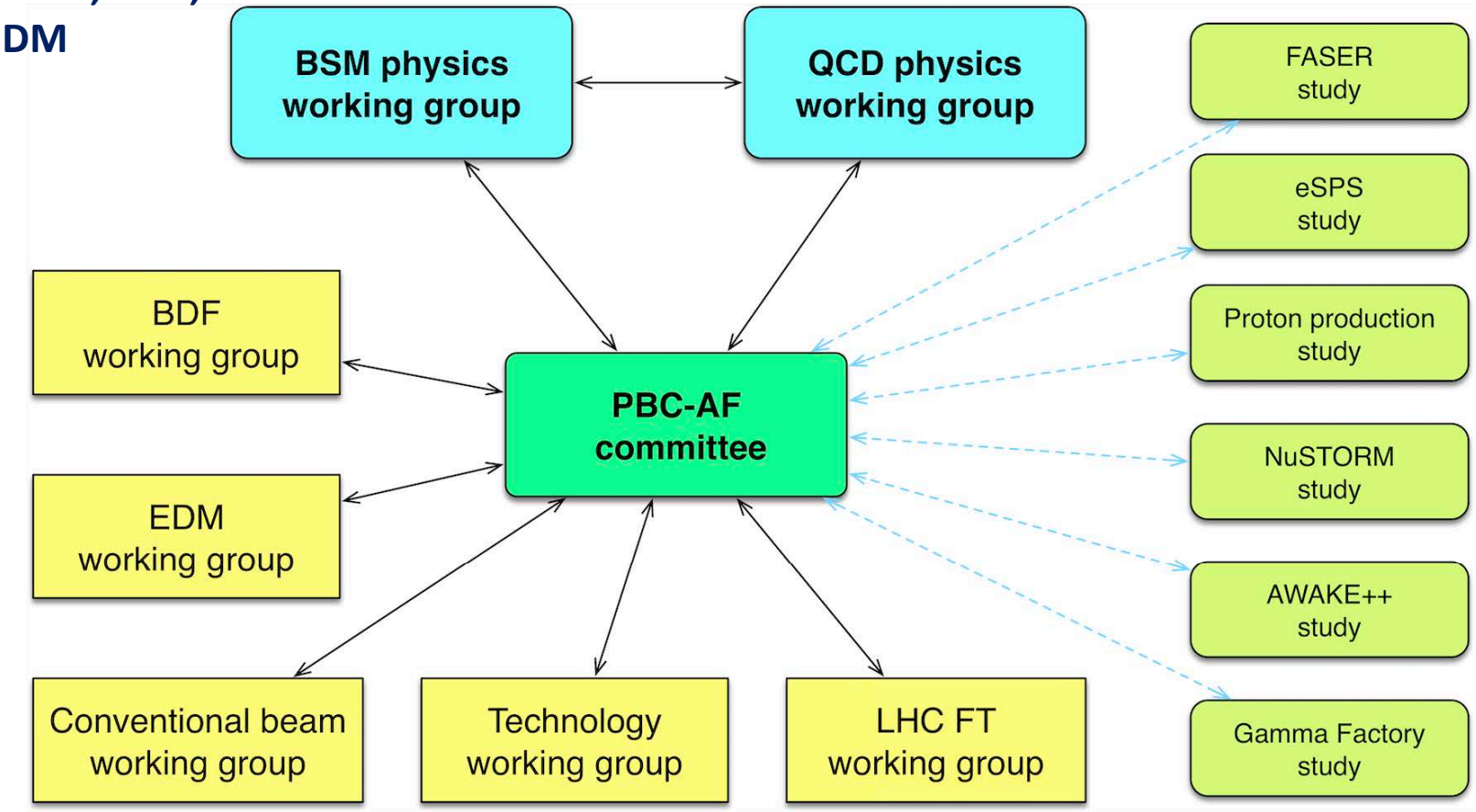


Organisation and follow-up of activities documented on http://pbc.web.cern.ch/

PBC WORKING GROUP STRUCTURE

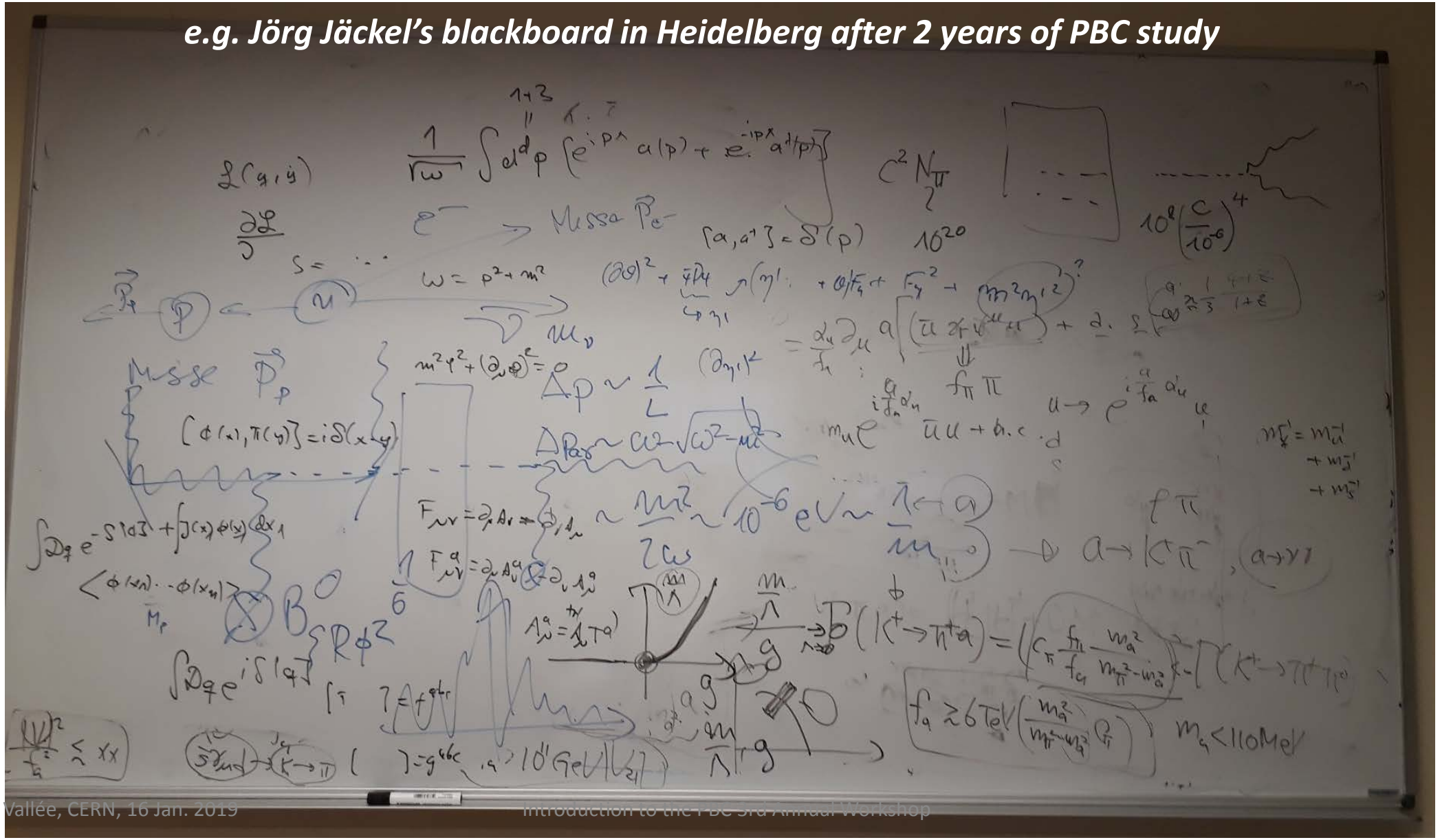
BSM conveners: C. Burrage, G. Lanfranchi, S. Rozanov, G. Ruoso
+ ext. experts + projects representatives:
NA62++, KLEVER, NA64++, SHiP,
LDMX, IAXO, JURA, EDM

QCD conveners: M. Diehl, J. Pawlowski, G. Schnell
+ ext. experts + projects representatives:
COMPASS++, MUonE, DIRAC++
AFTER, CRYSTAL,
LHCb-FT, ALICE-FT
NA61++, NA60++



~100 core members in the Working Groups
> 200 WG meetings in the past 2 years

NB: a lot of work provided not only by accelerator experts and experimentalists, but also by theorists:



PBC DELIVERABLES: ACCELERATOR WGs

Working group	10 pager for ESPP for 18th December - WG dependent	Possible proponents/clients submitting 10 pager to ESPP	PBC deliverable for 18th December * (referenced by 10 pager)
AWAKE++	Y	Proposed client experiment	Exploratory study
BDF	Y	SHiP, tauFV	Comprehensive Design Study - tauFV as appendix
Conventional beams	Y	NA61, NA62++, KLEVER etc.	Description of the conventional beam upgrades associated to the proposed projects
EDM	Y		Full report + 3 appendices: COSY; prototype; new ideas
eSPS	Y	LDMX,BD	Technical report on possible implementation at CERN, EoI submitted
FASER acc.	N	FASER	Technical proposal on possible implementation in LHC
Gamma factory	Y		Exploratory study
LHC FT	N	AFTER@LHC, LHCspin, MDM/EDM	Technical study of feasibility
nuSTORM	Y		Broad outline of a possible nuSTORM implementation at CERN
Perf post-LIU	N		Injector complex performance after LIU
Technology	Y	IAXO et al	Exploration and evaluation of possible technological contributions of CERN to non-accelerator projects possibly hosted elsewhere

Reports publicly available on CERN CDS: http://cds.cern.ch/collection/PBC%20Reports?ln=en

PBC DELIVERABLES: PHYSICS WGs

CERN-PBC-REPORT-2018-007
18 December 2018

Report of the BSM Working Group of the Physics Beyond Colliders at CERN

J. Beacham[1], C. Burrage[2,*], D. Curtin[3], A. De Roeck[4], J. Evans[5], J. L. Feng[6], C. Gatto[7], S. Gninenko[8], A. Hartin[9], I. Irastorza[10], J. Jaeckel[11], K. Jungmann[12,*], K. Kirch[13,*], F. Kling[6], S. Knapen[14], M. Lamont[4], G. Lanfranchi[15,*], C. Lazzeroni[16], A. Lindner[17], F. Martinez-Vidal[18], M. Moulson[15], M. Papucci[4,19], I. Pedraza[20], K. Petridis[21], M. Pospelov[22,*], A. Rozanov[23,*], G. Ruoso[24,*], P. Schuster[25], Y. Semertzidis[26], T. Spadaro[15], C. Vallée[23], and G. Wilkinson[27].

~140 pages

CERN-PBC-REPORT-2018-008

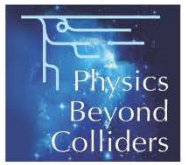
Physics Beyond Colliders QCD Working Group Report

A. Dainese[1], M. Diehl[2,*], P. Di Nezza[3], J. Friedrich[4], M. Gaździcki[5,6] G. Graziani[7], C. Hadjidakis[8], J. Jäckel[9], M. Lamont[10] J. P. Lansberg[8], A. Magnon[10], G. Mallot[10], F. Martinez Vidal[11], L. M. Massacrier[8], L. Nemenov[12], N. Neri[11,13], J. M. Pawlowski[9,*], S. M. Puławski[14], J. Schacher[15], G. Schnell[16,*], A. Stocchi[17], G. L. Usai[18], C. Vallée[19], G. Venanzoni[20]

~80 pages

Reports publicly available on CERN CDS: http://cds.cern.ch/collection/PBC%20Reports?ln=en

PBC DELIVERABLES: MAIN SUMMARY SUBMITTED TO EPPSU

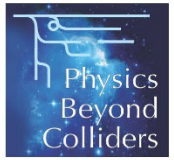


December 2018

The Physics Beyond Colliders Study at CERN

Jörg Jäckel, Mike Lamont and Claude Vallée *
PBC coordinators and contacts to the European Strategy Group

10-pager presenting the PBC process + executive summary



CERN-PBC-REPORT-2018-003, December 2018

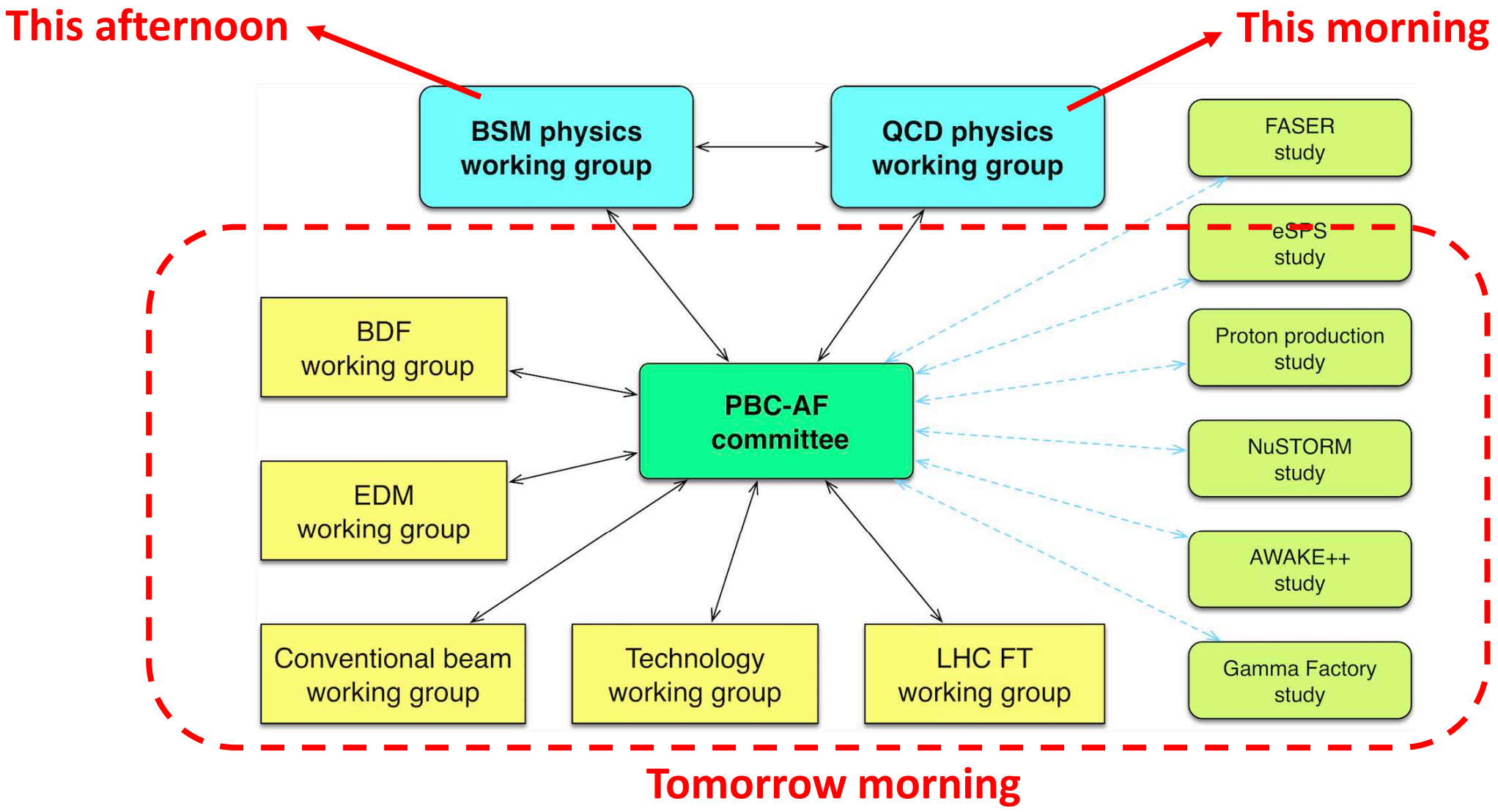
Summary Report of Physics Beyond Colliders at CERN

R. Alemany[1], C. Burrage[2], H. Bartosik[1], J. Bernhard[1], J. Boyd[1], M. Brugger[1], M. Calviani[1], C. Carli[1], N. Charitonidis[1], D. Curtin[23], A. Dainese[34], A. de Roeck[1], M. Diehl[3], B. Döbrich[1], L. Evans[1], J.L. Feng[24], M. Ferro-Luzzi[1], L. Gatignon[1], S. Gilardoni[1], S. Gninenko[19], G. Graziani[32], E. Gschwendtner[1], B. Goddard[1], A. Hartin[16], I. Irastorza[20], J. Jäckel[4], R. Jacobsson[1], K. Jungmann[5], K. Kirch[6], F. Kling[24], W. Krasny[13], M. Lamont*[1], G. Lanfranchi[7], J-P. Lansberg[27], A. Lindner[3], K. Long[12], A. Magnon[1], G. Mallot[1], F. Martinez Vidal[21], M. Moulson[7], M. Papucci[1], J. Pawlowski[4], I. Pedraza[25], K. Petridis[18], M. Pospelov[8], S. Pulawski[31], S. Redaelli[1], S. Rozanov[9], G. Rumolo[1], G. Ruoso[10], J. Schacher[29], G. Schnell[11], P. Schuster[22], Y. Semertzidis[14], A. Siemko[1], T. Spadaro[7], S. Stapnes[1], A. Stocchi[28], H. Ströher[15], G. Usai[30], C. Vallée*[9], G. Venanzoni[26], G. Wilkinson[33], and M. Wing[16]*

Addendum (~60 pages) summarizing all PBC reports

Reports publicly available on CERN CDS: http://cds.cern.ch/collection/PBC%20Reports?ln=en

THIS WORKSHOP: WORKING GROUP REPORTS



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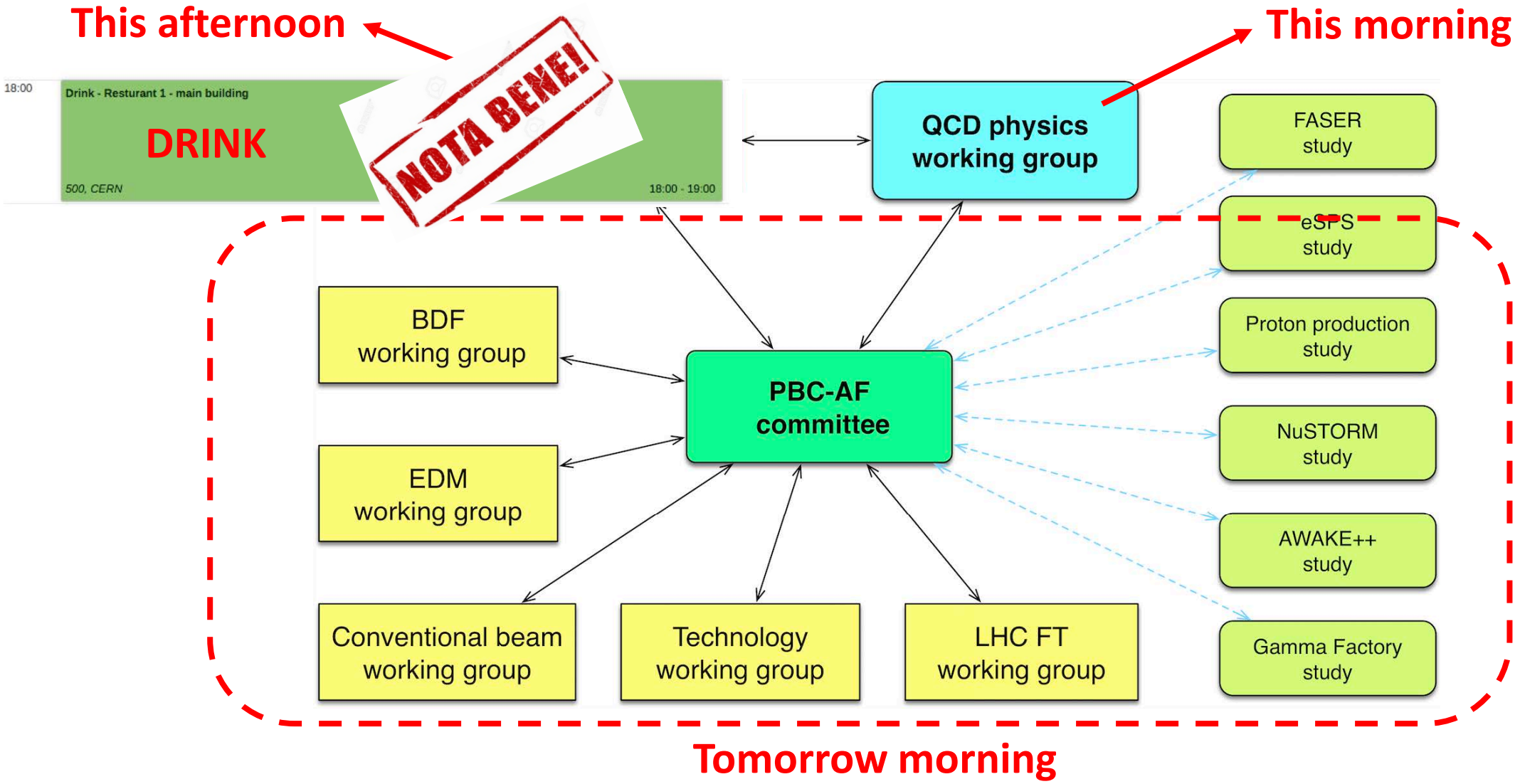

NB: TOMORROW AFTERNOON

Summary of the main issues and discussion of future plans

14:00 → 17:00 **Summaries, synthesis, future**

- **14:00** **Accelerator** 30m
  Orateur: Mike Lamont (CERN)
- **14:40** **Experiment** 30m
  Orateur: Claude Vallee (Centre de Physique des Particules de Marseille)
- **15:20** **Coffee** 20m
- **15:40** **Theory** 30m
  Orateur: Joerg Jaeckel (ITP Heidelberg)
- **16:20** **Discussion** 40m