



Midterm Report - Norway

ECFA 15.11.2019

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Topographic Map of Norway and most of the Scandinavian Peninsula.

Norway

- Kingdom of Norway - Constitutional Monarchy
- Population 5.3 M (Aug 2018)
- Resources and industry: Petroleum and natural gas, shipping and ship-building, seafood and aquaculture (salmon!), minerals (thorium!), lumber, pulp and paper, fresh water and hydroelectric power
- Top-10 international per-capita income, state wealth (nr. 1), equality, integrity, happiness, low crime
- Member of European Economic Area (no to EU in 1972,94)

Norway at CERN (10.19)

- Among founding members
- Contribution to CERN 2.4% (230 MNOK/yr)
- 88 users (1.2 % of member state users)
- 61 national users
- 18 staff (0.7%), 18 fellows (2.3%)
- Technical+admin students 11+3 (~6%)
- Teacher programme 140 (1.4%)

**1 € = 10.2 NOK
(6.7 in 2013)**

Industrial Return

Industrial Returns for CERN Member States

For Supply contracts between 01.03.2019 until 29.02.2020

The **return coefficient** of a Member State is defined as the ratio between that Member State's percentage share of the value of all Supply contracts and that Member State's percentage contribution to the CERN Budget over the same period.

A Member State is defined as **very poorly balanced** if its return coefficient for Supply contracts falls below 0.40, **poorly balanced** if its return coefficient for Supply contracts falls below 1.00 and **well balanced** if it is equal or greater than that value.

The **country of origin** is the country where the supplies (including their components and sub-assemblies) are manufactured or undergo the last major transformation by the contractor or his sub-contractor(s).

Well Balanced	Poorly Balanced	Very Poorly Balanced
Bulgaria	Austria	Croatia*
Czech Republic	Belgium	Cyprus*
France	Denmark	India*
Hungary	Finland	Israel
Italy	Germany	Lithuania*
Poland	Greece	Norway
Slovakia	Netherlands	Slovenia
Switzerland	Pakistan*	Sweden
	Portugal	
	Romania	
	Serbia	
	Spain	
	Turkey*	
	Ukraine*	
	United Kingdom	

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Well Balanced	Poorly Balanced	Very Poorly Balanced
Bulgaria Czech Republic France Hungary Italy Poland Slovakia Switzerland	Austria Belgium Denmark Finland Germany Greece Netherlands Pakistan* Portugal Romania Serbia Spain Turkey* Ukraine* United Kingdom	Croatia* Cyprus* India* Israel Lithuania* Norway Slovenia Sweden

**Healthy economy
Oil industry**

Research (2016-19)

- AEGIS (2.0 MNOK)
- ALICE (34.5)
- ATLAS (44.0)
- ISOLDE (2.0)
- Heavy Ion Theory (4.5)
- Committees ECFA/ACCU/LHCC/etc (1.2)
- “Technology”: Students@CERN/ILO/Accelerators/Detectors (11.0)

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CERN - Norsk forskning ved CERN

Hovedformålet er å finansiere fortsatt norsk deltagelse i de store og langvarige CERN-eksperimentene som norske forskere har vært med å utvikle, bygge opp og delta i over mange år. En stor del av støtten skal dekke Norges bidrag til drift og vedlikehold av disse eksperimentene.



> CERN

CERN-laboratoriet nær Genève er verdensledende innenfor høyenergi partikkel- og kjernefysikk. Norge har vært medlem av CERN siden organisasjonen ble dannet i 1954. Norges årlige medlemskontingent til CERN på cirka 230 millioner kroner, finansieres direkte over statsbudsjettet. Forskningsrådets CERN-finansiering skal sikre best mulig vitenskapelig utnyttelse av Norges CERN-medlemskap.

Norsk CERN-forskning blir jevnlig evaluert. Deltagelse i evalueringen er åpen for alle relevante, norske forskningsgrupper. Forrige evaluering var i 2017 og evalueringsrapporten fås tilsendt ved henvendelse til Forskningsrådet

> CERN i Prosjektbanken

Se prosjektinformasjon og statistikk i Prosjektbanken til Forskningsrådet.

24,7
millioner kroner
ble bevilget til prosjekter i 2018
[Per year]

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New since last R-ECFA visit

- NorLHC project - secured 2/3 of funding for ALICE, ATLAS and Tier-1 upgrades
- Relatively new theory group in Stavanger (QCD++)
- 2020-2027 - Administration of CERN-related research program delegated to the Universities
 - A work in progress
 - Funding cut (24.7->22.9 MNOK/yr)
 - Administration costs also delegated, w/o funding

New programme 2020-27

Funding for Norwegian Research at CERN

Application type: Research Centre

Application deadline: 20. November 2019, 13:00 CEST

Relevant thematic areas for this call: [Scientific quality](#)

Target groups: Research organisations

Amount of funding presumed available for this call for proposals:

NOK 182 800 000. Only one project will be granted funding.

Project duration: 96-96 months

Contact for the call: Liv Furuberg | lfu@forskningsradet.no

Create application

[Download the call](#)

[Download templates](#)

Purpose

The CERN laboratory close to Geneva is a global leader in high-energy particle and nuclear physics. Norway has been a member of CERN since the organisation was established in 1954. Norway's annual membership fee is approximately NOK 230 million, funded directly over the government budget.

Funding is being made available under this call for a project to ensure the best possible scientific use of Norway's CERN membership.

The purpose of this call for proposals is to provide funding for continued Norwegian participation in the large-scale, long-term CERN experiments that Norwegian researchers have helped to develop, establish and take part in over many years. A large portion of this funding is to cover Norway's contribution to the operation and maintenance of these experiments, with associated electronic infrastructure. Funding will also be provided for some research in connection with these experiments. Participation in selected, lower-cost experiments at CERN may also be given priority and be included.

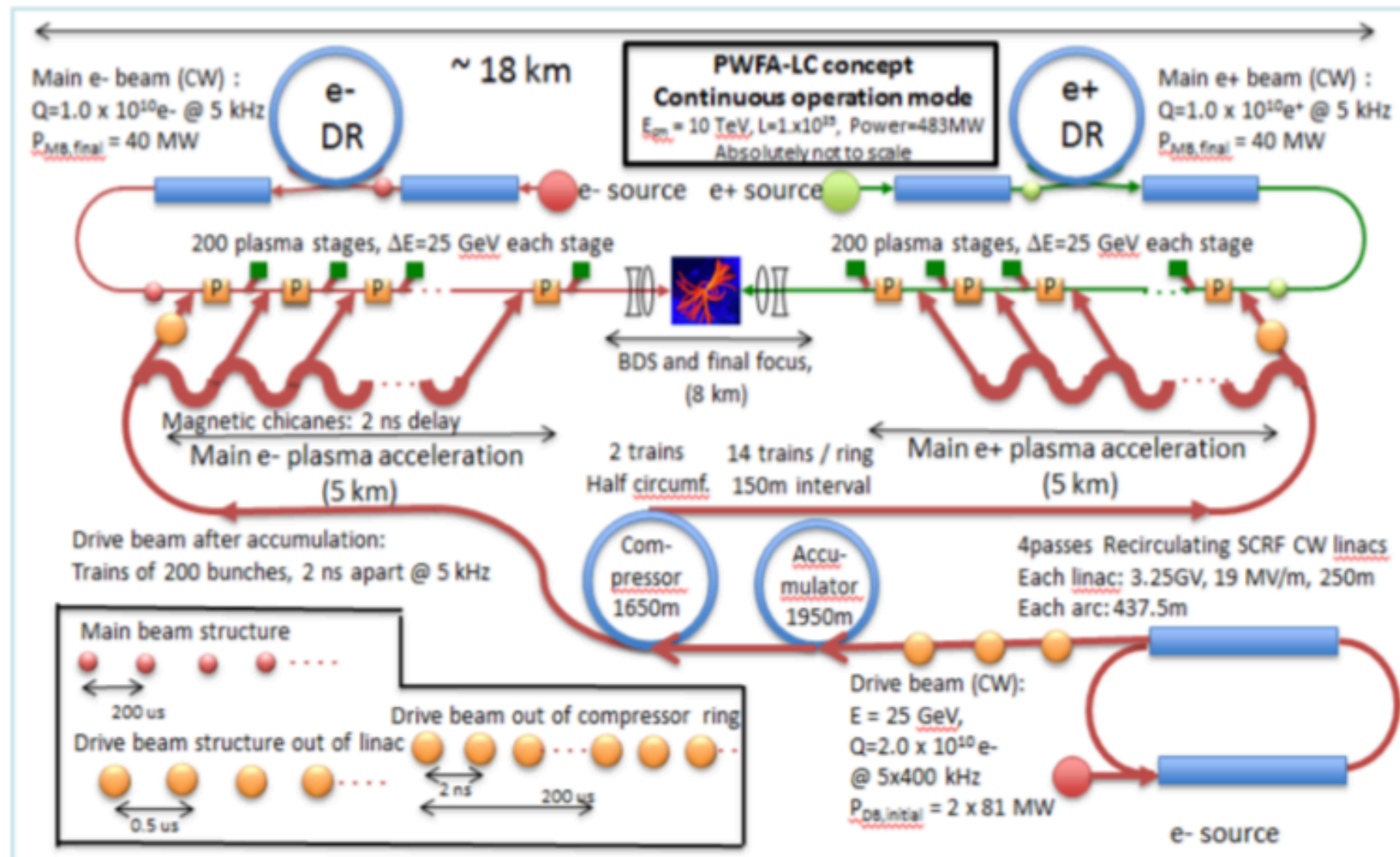
A position for a Norwegian Industrial Liaison Officer (ILO) is to be funded under the project. The project must also co-finance Norwegian technical students at CERN, visits to CERN by Norwegian upper secondary schools, and other CERN events designed to generate greater interest in CERN in Norway.

- Research Council of Norway (RCN) is main source of funding for ongoing CERN-related research
- Universities contribute about the same again: mainly personell, PhD stipends, and facilities
- Possible to apply for independent projects but until recently large majority of applications forwarded to program
- 7% cut compared to 2016-19
- CERN user community has never been bigger nor more active in experiments, theory, detectors, computing, accelerators, outreach and education
- No compensation for salary, inflation, exchange ratio
- This budget and universities expected to pay administration costs (U. Oslo faculty to get started)

Selected recent highlights

Acceleration to HEP Energies in PWA

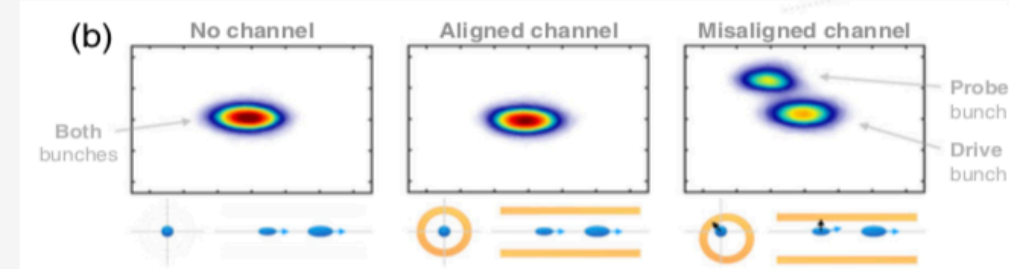
Adli, SLAC-PUB-15426 (2013)



Positron Acceleration, FACET

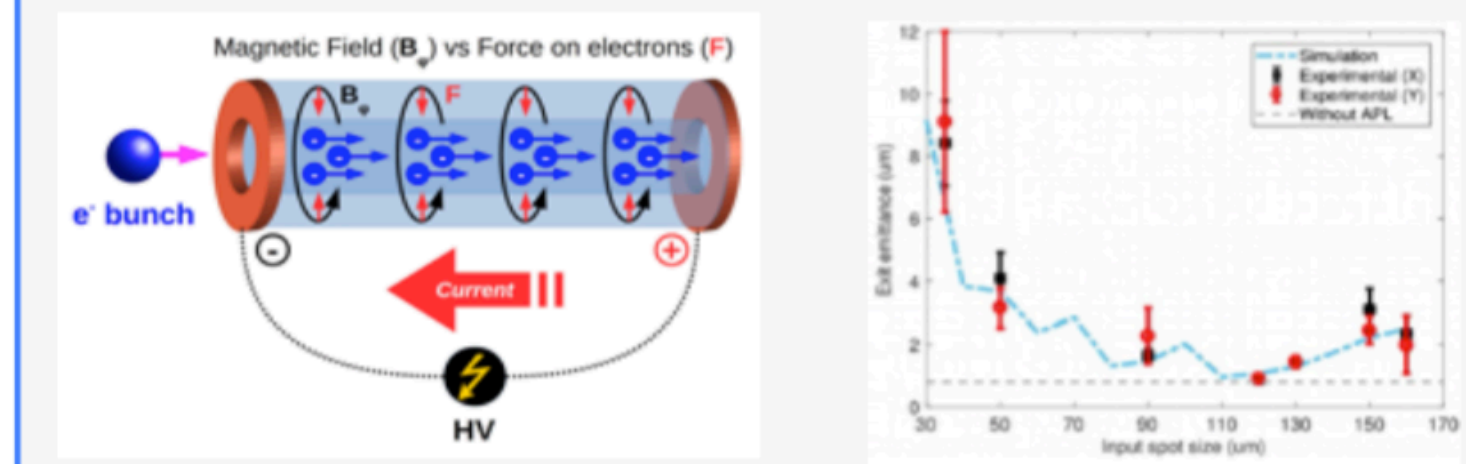
Measurement of **transverse wakefields in a hollow plasma channel** due to off-axis drive bunch propagation.

C. A. Lindstrøm et al. *Phys. Rev. Lett.* 120 124802 (2018).



Plasma Lens Experiments:

Acceleration of high brightness beams and transport to the final application, while preserving the high quality of the 6D phase space



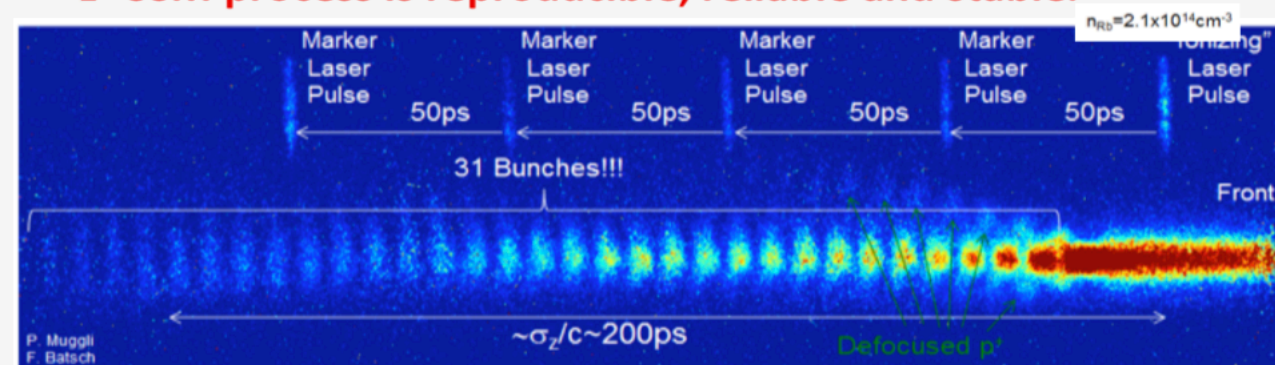
R. Pompili et al., *PRL* 121 (2018), 174801

BELLA, LBNL: J. van Tilborg et al., *PRL* 115 (2015), 184802

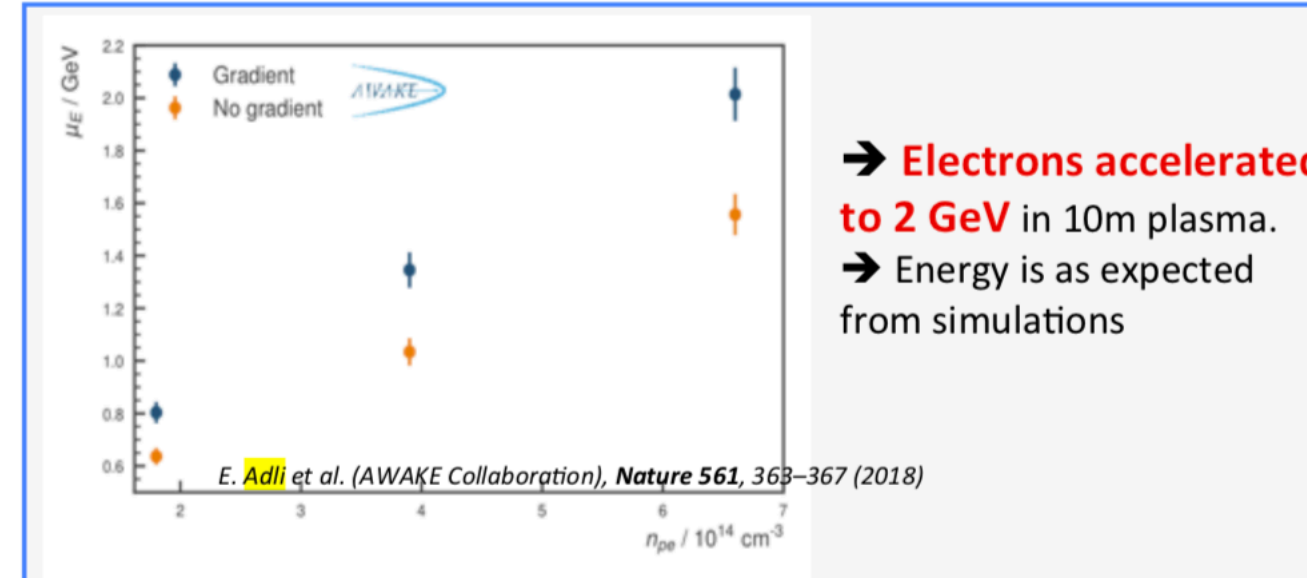
CLEAR, CERN: C.A. Lindstrøm et al., *PRL* 121 (2018), 194801

Seeded self-modulation of the proton bunch:

→ SSM process is reproducible, reliable and stable.



E. Adli et al. (AWAKE Collaboration), *Phys. Rev. Lett.* 122, 054802 (2019).
 M. Turner et al. (AWAKE Collaboration) *PRL*, 122, 054801 (2019).



Concerns from R-ECFA visit (2015)

- Need to strengthen detector R&D and projects
 - Upgrades of ALICE and ATLAS now 2/3 funded
 - Huge upgrade of lab facilities, together with the universities
 - Spin-off instrumentation project “Proton-CT - a novel diagnostic tool for particle therapy” (D. Rörich, U. Bergen)
- Number of MSc and PhD students low “due to funding”
 - Above average exploitation of technical student program at CERN
 - Number of MSc students determined mainly by interest, not funding (tough competition with e.g. Computational Physics in Oslo and Applied Physics in Bergen)
 - PhD numbers have never been higher than now (more funding sources, e.g. MC ITN)

Summary

- Some progress on concerns from R-ECFA visit in 2015
 - Detector upgrades (mostly) funded, labs improved, a spin-off project
 - Number of MSc+PhD students has never been higher
- The placement of the administration of CERN-related research funds in the hands of the universities is new
 - The (growing!) community is concerned about the funding cut and the administrative costs (U.Oslo will bear them in a transition phase)
- We intend to continue a small but vibrant program in CERN-related research, detector, accelerator and computing developments, and research-based education and outreach