RECFA meeting Copenhagen May 12, 2022

Inputs from Head of Departments

Jan W. Thomsen, Head of Department,

Niels Bohr Institute, Copenhagen University (KU)

Ulrik I. Uggerhøj, Head of Department,

Department of Physics and Astronomy, Aarhus University (AU)

Lars Porskjær Christensen, Head of Department,

Institute for Physics, Chemistry and Pharmacy,

University of southern Denmark (SDU)

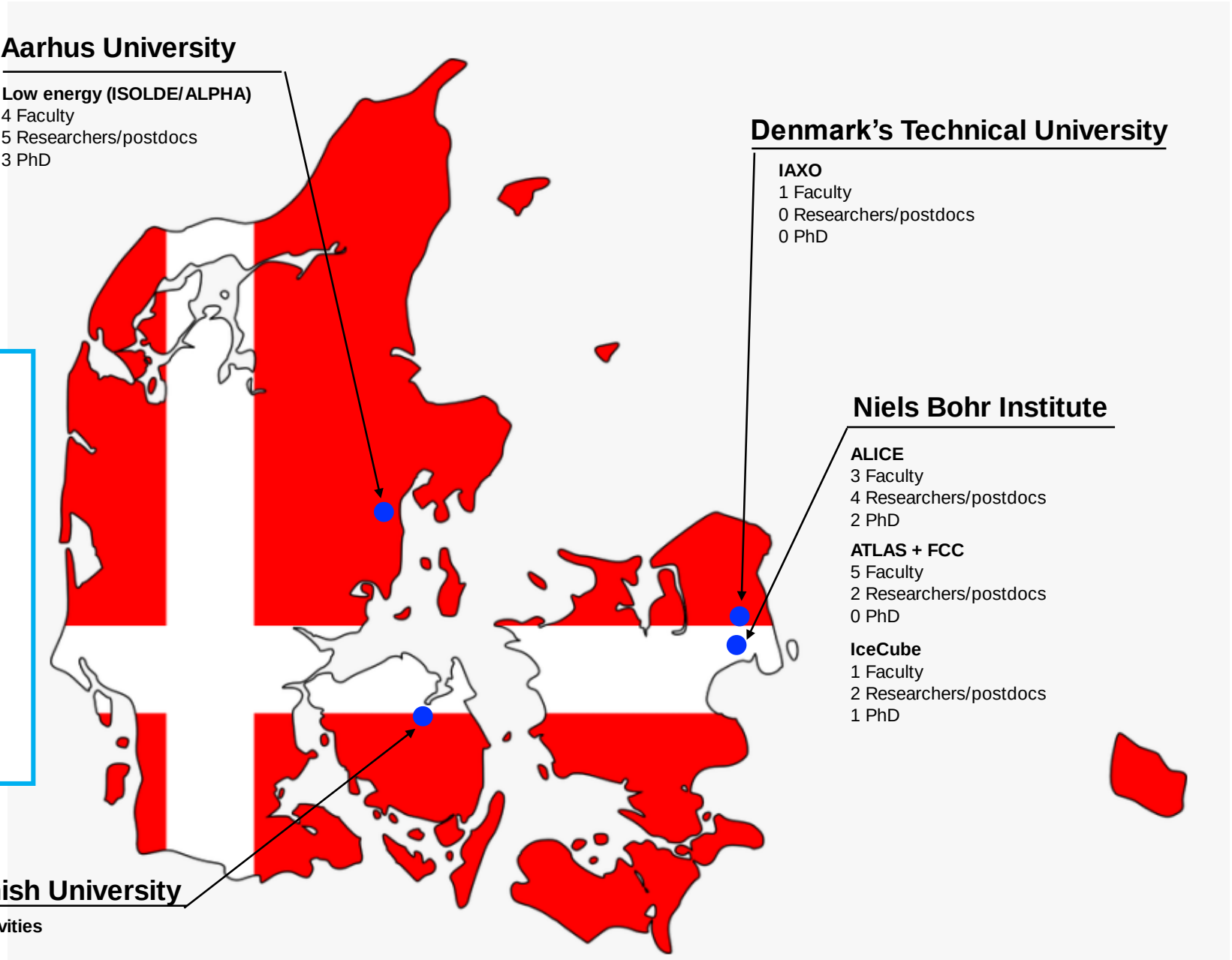
Henning Skriver, Head of Department,

DTU space, The Technical University Denmark (DTU)

Jane Hvolbæk, Head of Department,

DTU Physics, The Technical University Denmark (DTU)

Experimental CERN-related Research in Denmark



Aarhus University

Low energy (ISOLDE/ALPHA)
4 Faculty
5 Researchers/postdocs
3 PhD

Denmark's Technical University

IAXO
1 Faculty
0 Researchers/postdocs
0 PhD

Niels Bohr Institute

ALICE
3 Faculty
4 Researchers/postdocs
2 PhD

ATLAS + FCC
5 Faculty
2 Researchers/postdocs
0 PhD

IceCube
1 Faculty
2 Researchers/postdocs
1 PhD

Southern Danish University

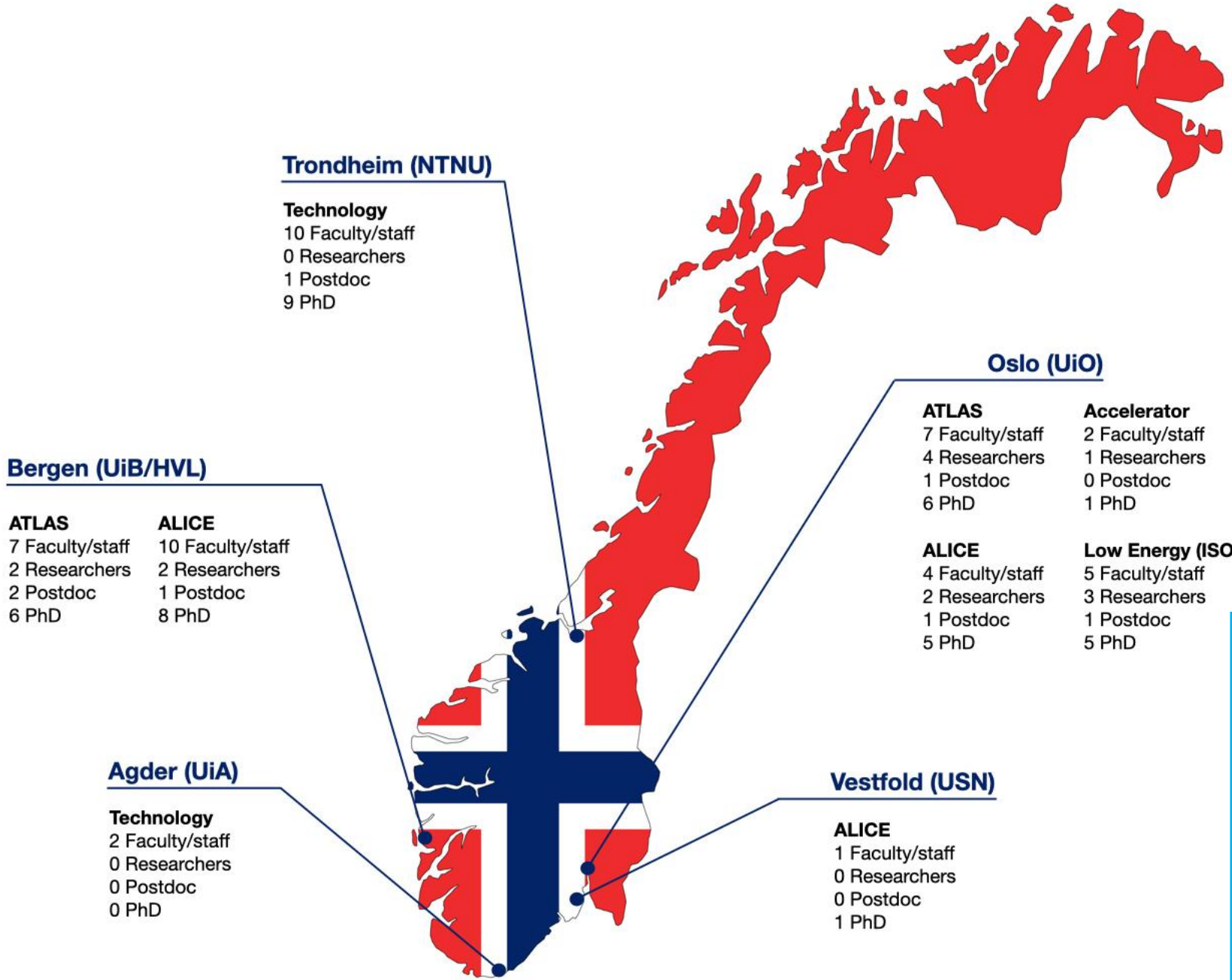
No experimental activities

Total DK

Faculty : 14
Post doc: 13
PhD : 5

Funded from DK:

NICE	7.5 MDKR
Salaries	12.0 MDKR
Tech	1.5 MDKR



Total NO

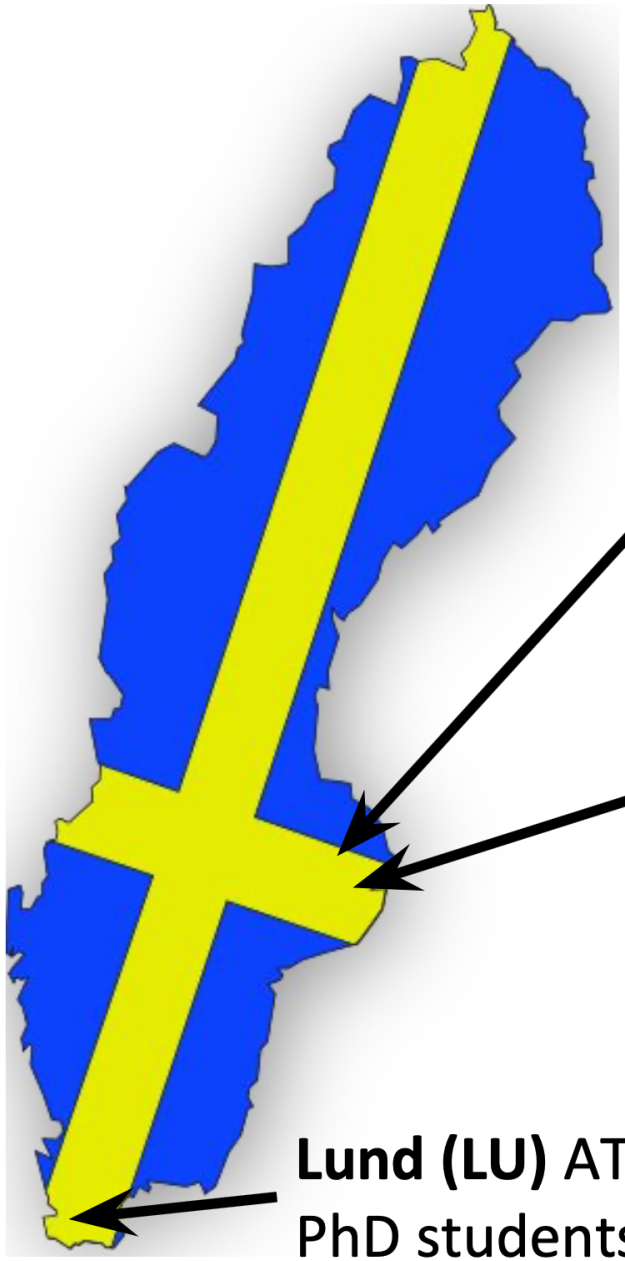
Faculty : 48

Post doc: 7

PhD : 41

Source : From Prof. Alex Read, University of Oslo, via Mogens Dam

LHC in Sweden



Uppsala (UU)
ATLAS: 5 faculty, 1 researcher, 1 postdoc, 5 PhD students

Stockholm (SU)
ATLAS: 6 faculty, 4 postdocs, 9 PhD students

KTH
ATLAS: 2 faculty, 1 researcher, 3 postdocs, 2 PhD students

Lund (LU) ATLAS: 7 faculty, 2 postdocs, 2 researcher/staff, 7 PhD students, ALICE: 3 faculty, 1 postdoc, 4 PhD students

Total SE

Faculty :	23
Post doc:	11
PhD :	27

Source : From Swedish ECFA mid-term report by Prof. David Milsted, Stockholm University, 19 Nov. 2020.

The Danish Funding Landscape

Public Funds

Danish National Research Foundation (DNRF)

Independent research Fund Denmark (DFF)

Innovation Fund Denmark (IFD)

Etc.

Private Funds

Novo Nordic Foundation (NFF)

Villum Foundation

Carlsberg Foundation

Etc.

Challenge: Increasingly difficult to attract funds for fundamental physics

Political decision: Allocate a larger fraction of public funds to green technology

Boundaries: Private funds very specific

The Danish Funding Landscape

Public Fu

Danish Nationa

Independent re

Innovation Fun

Etc.

State budget agreement 2022 (Forskningsreserven) MDKR

Ambitious and permanent green research initiatives	**1573,5**
Digitizing, technology and innovation, production	**589,0**
Life science, health and clinical research	**430,0**
A strong foundation for research (fundamental research etc.)	**314,5**

Cha

Poli

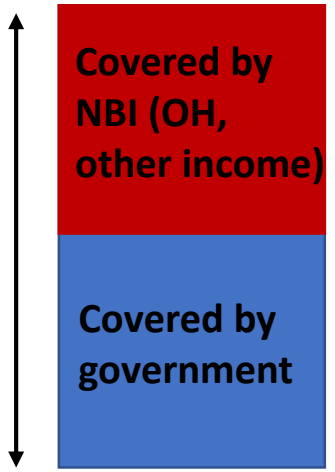
Boundaries: Private funds very specific

Typical institute economy – exemplified by NBI 2022 numbers

Typical institute economy yearly budget (NBI 2022) all in MDKR

Income	329,0
Salary VIP/TAP	233,3
Running costs	97,7
Result	+2,0

Salary tenured VIP/TAP: 90,0



40,0

50,0

OH = Overhead

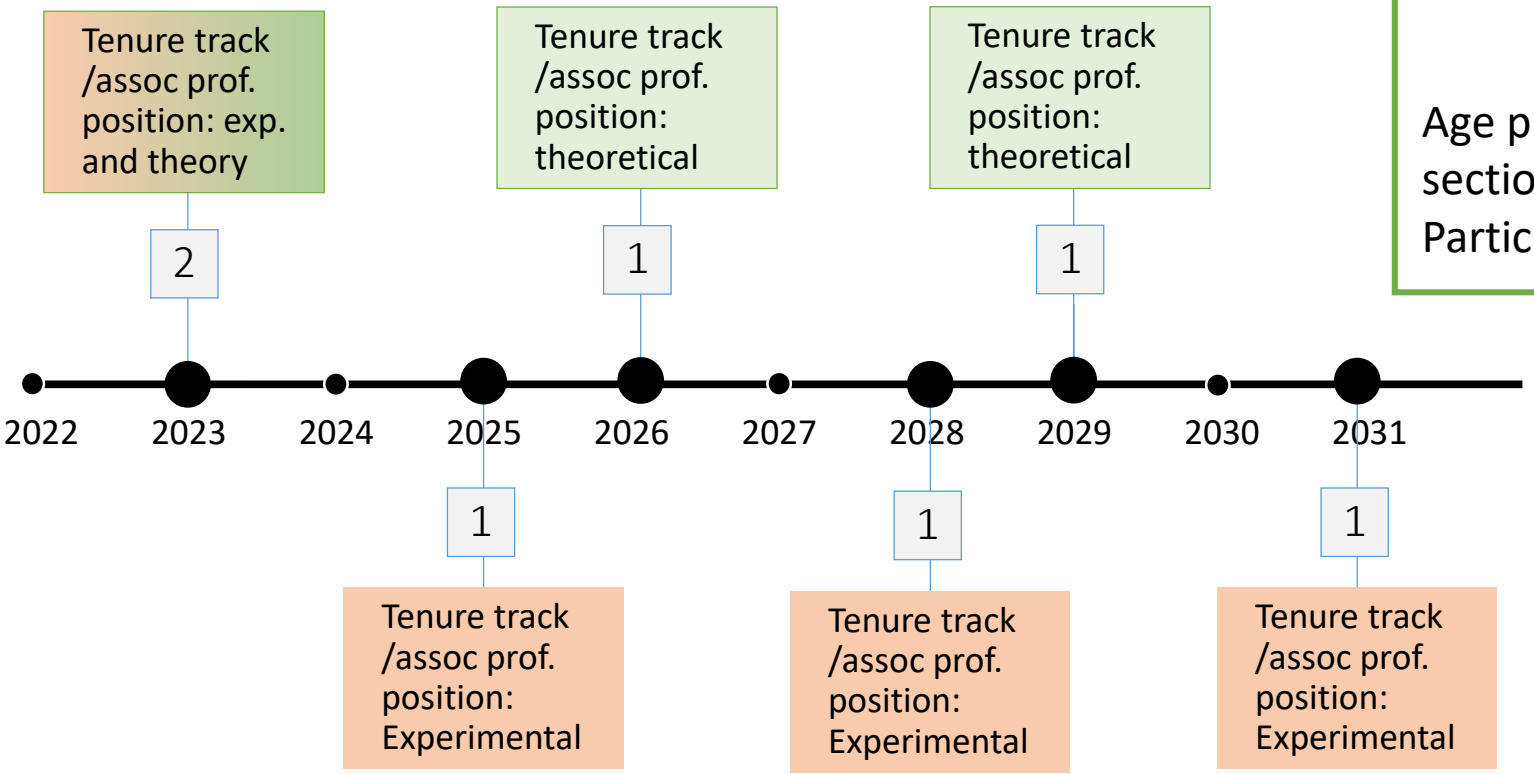
Challenge: Indexing of salary 1,5 % per year does not apply to red part!

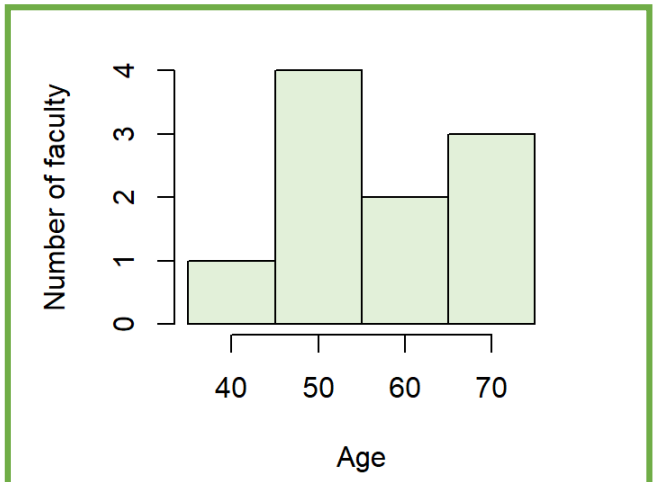
Fluctuations in OH and other income.

Amounts to removal of one full position per year

The Niels Bohr Institute Faculty Renewal Program

The current permanent faculty at NBI counts 72 members. Many areas of research at NBI, including experimental particle physics, will face significant retirements in the coming years. Despite financial uncertainties, NBI will implement a faculty renewal program over the next decade.





Age profile of the NBI section for Experimental Particle Physics

Increasing the Danish return of investment
- Notes for discussion

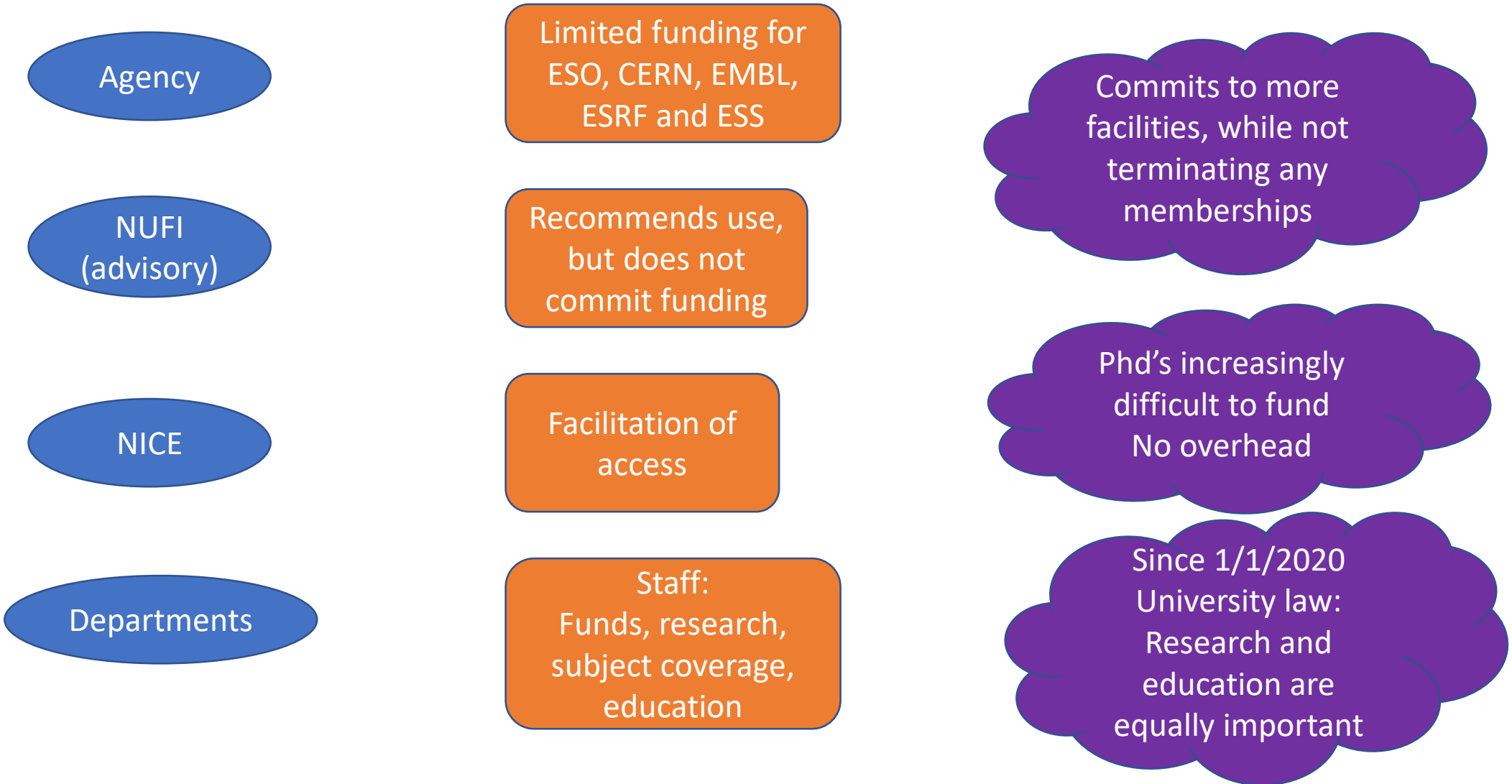
Optimal conditions for science

(Bounds on NICE funds, increasing number of phd's and postdocs, tech support,…)

CERN as technology center

(Advanced electronics, mechanics, AI and ML applications, medicine, HPC applications, quantum technologies,…)

Who carries the responsibility, who funds and what are the/some of the problems?



NICE - National Instrument Center for CERN Experiments

Purposes:

- "The primary purpose of the Danish follow-up research centres is to coordinate and support the outcome of the Danish memberships of international research infrastructures."
- "Facilitation of access to international research infrastructures" [i.e. 'travel money']
- "Communication of PhD and postdoc opportunities and participation in summer schools at Master's level" [i.e. no PhD stipends]

Supported, e.g.:

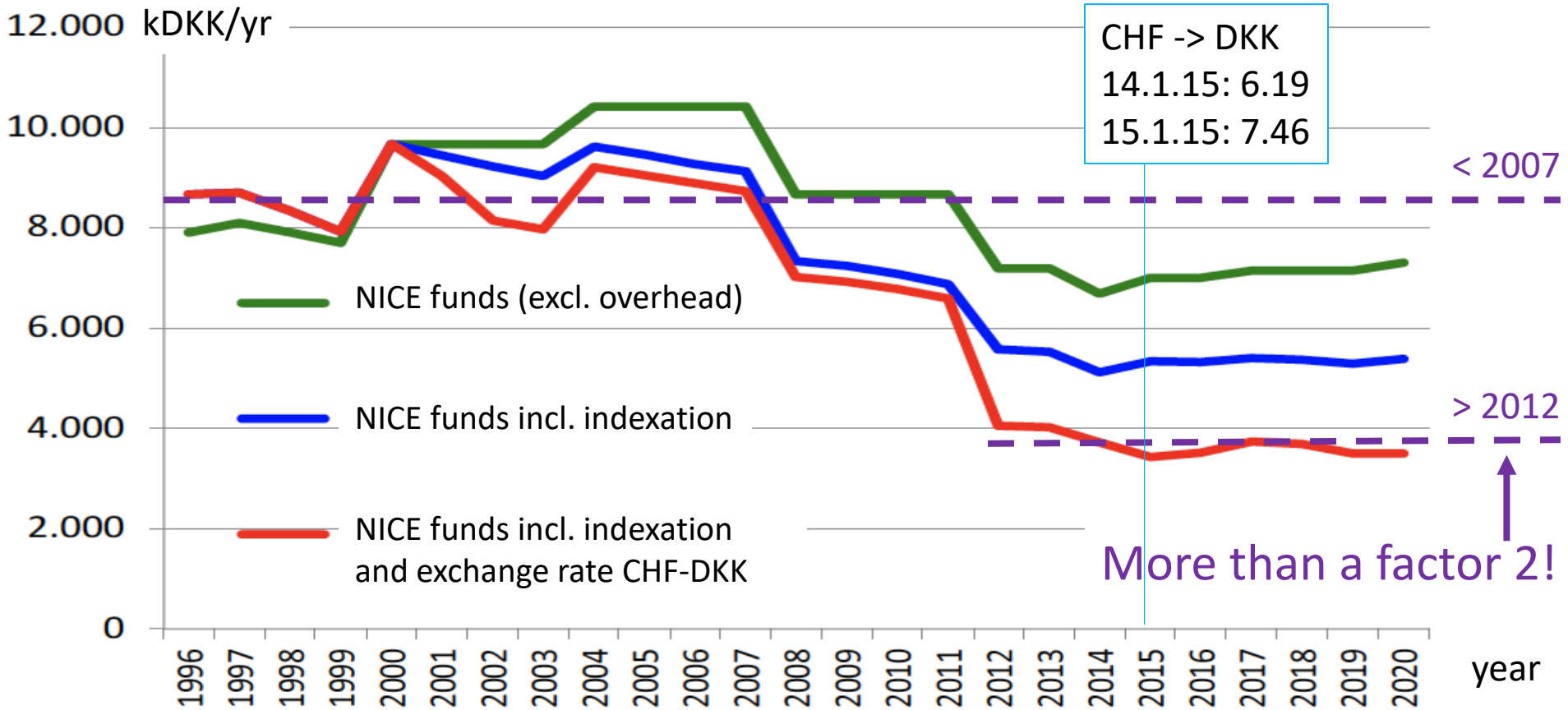
- Seconded staff (for example, tech graduates or postdocs), adjustment and testing of instruments and equipment, development of hard and software, testing and validation, contributions to experiments and travel in connection with access.

According to the Grant Letter by the Agency

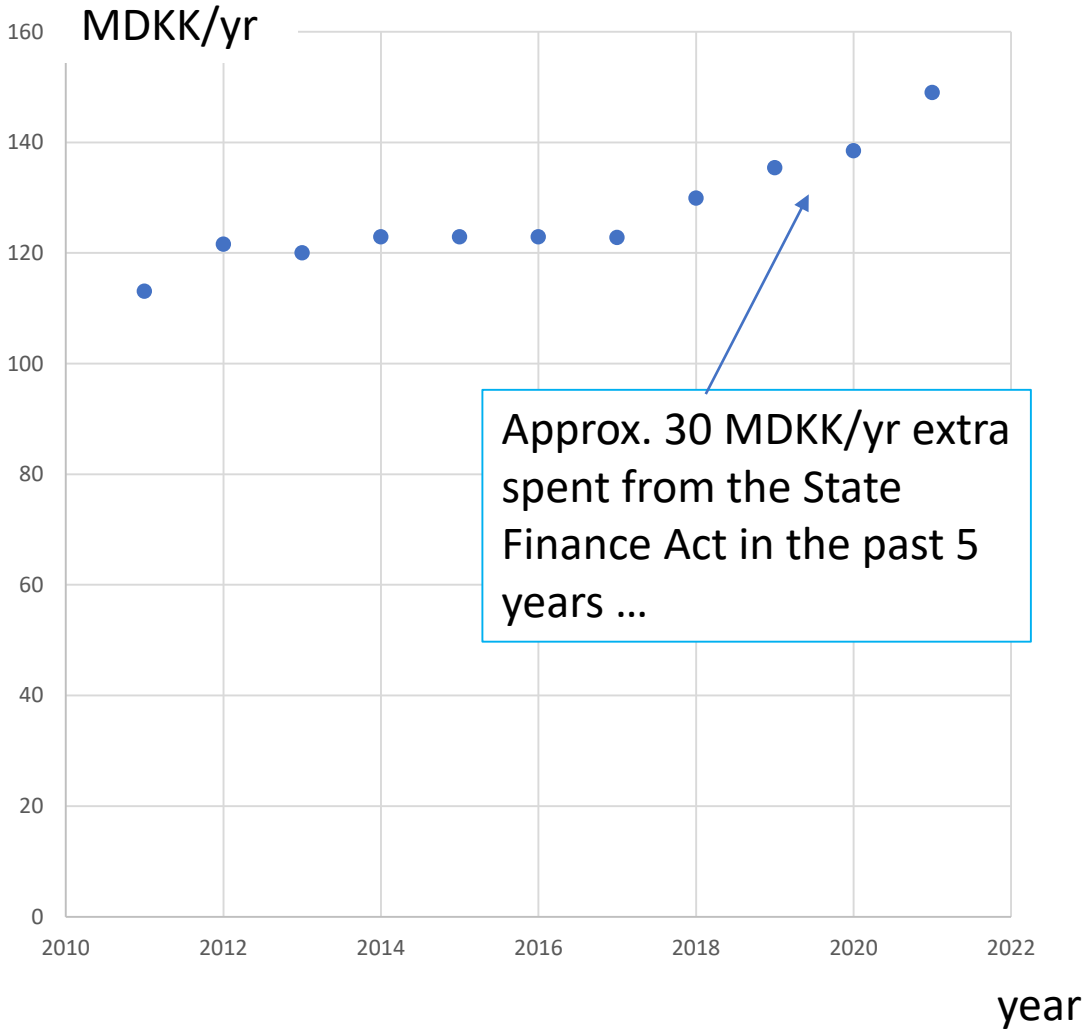
Budget for CERN-related activities (NICE-funds)

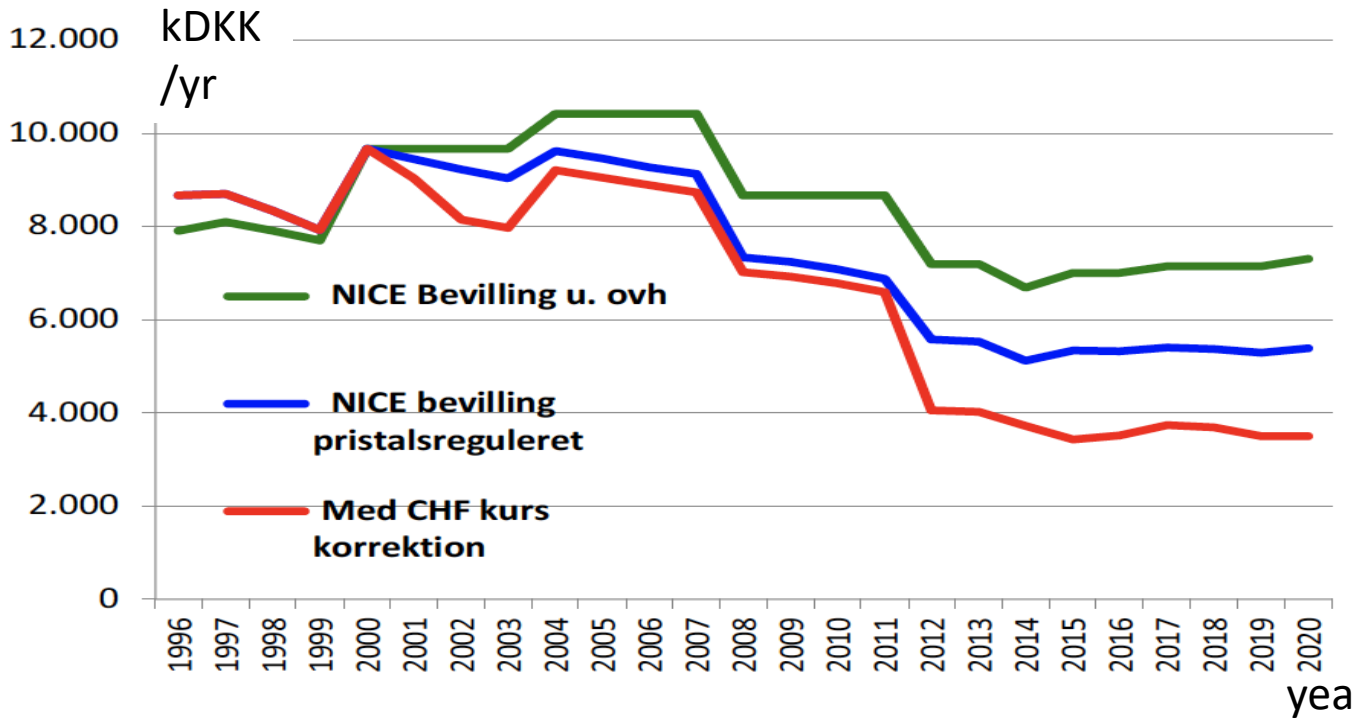
- Cut-backs on NICE-funds ‘recommended’ by the agency to be absorbed by removal of phd-positions since 2007, since 2011 illegal to finance phd-positions with NICE-funds

Since 2012 with no overhead, i.e. it costs the departments approx. ¼ mio. per mio. to accept, and a strong signal to private foundations that removing overhead is fine.



Danish CERN contribution and NICE-budget





<u>In 2021:</u>

7.3/(149+7.3) = 4.7%

to benefit from the Danish CERN membership fee…

… yet there cannot be found room in the same State Finance Act in the past 5 years to increase by e.g. 4 MDKK/yr

On the level of support to CERN activities from the Department of Physics and Astronomy, Aarhus University (DPAAU)

List of Aarhus permanent staff members active, and in which experiment(s) [with estimated extent given in % of the time they can spend on research in hrs./week]:

- Hans Fynbo, ISOLDE [90% of 20], experiment – pension probably within 20 years
- Karsten Riisager, ISOLDE [90% of 30], experiment – pension probably within 10 years
- Ulrik Uggerhøj, NA63, CLIC, ASACUSA [70% of 5], experiment – pension probably within 15 years
- Jeff Hangst, ALPHA [100% of 37], experiment – pension probably within 10 years
- Allan H. Sørensen, NA63 [25% of 37], theory – pension probably within 3 years
- Søren Pape Møller, NA63 [10% of 5], experiment – pension within 1 year

Approximately 3-4 FTE of a total scientific staff of 40 FTE.

Previous members in the past 20 years:
Helge Knudsen, experiment, retired 2014 – position not refilled
Aksel Jensen, theory, retired 2015 – position not refilled

- DPAAU is facing severe budget constraints in the coming years (4-5 years, possibly 10).
- Economically we cannot refill any of the above retirements and we cannot post new positions within CERN-related fields.
- The University Law has research and education at the same level: we are not encouraged to hire in fields that can not support phd's.