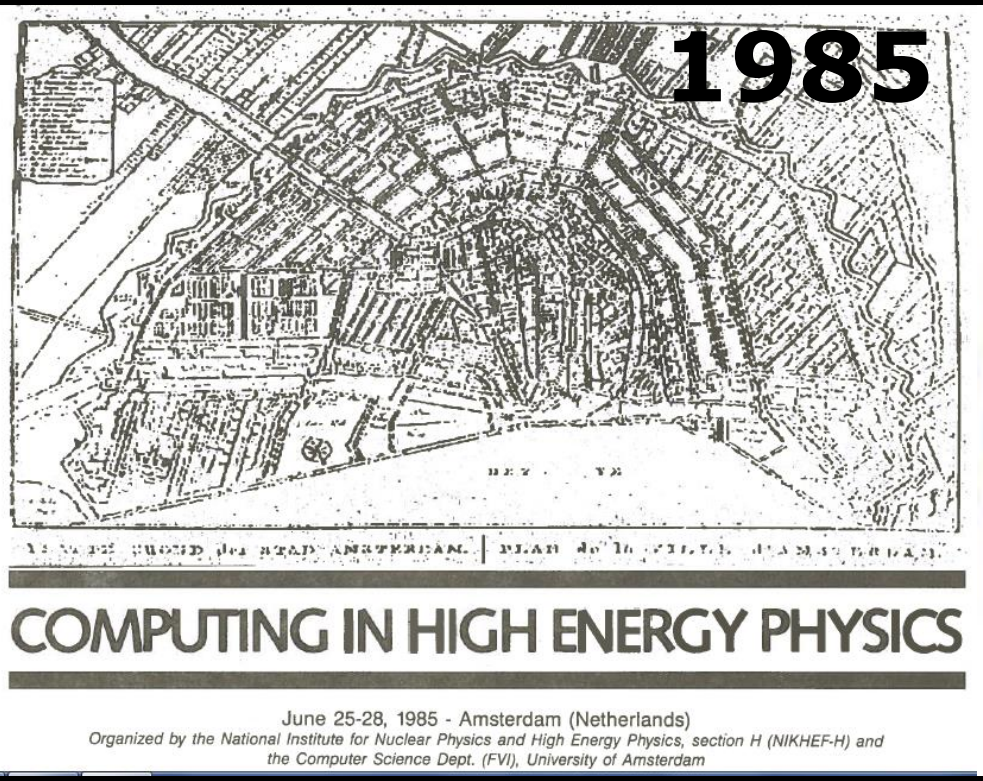
National Institute for Nuclear Physics and High-Energy Physics



2013

CHEP '13
AMSTERDAM

National Institute for Subatomic Physics

NIKHEF

NIKHEF

nikhef

National institute for subatomic physics

Amsterdam has excellent Indonesian restaurants

Nikhef's mission statement

The mission of Nikhef is to study the interactions and structure of all elementary particles and fields at the smallest distance scale and the highest attainable energy.

Two complementary approaches are followed:

- ***Accelerator-based particle physics***
  Studying interactions in particle collision processes at particle accelerators, in particular at CERN;
- ***Astroparticle physics***
  Studying interactions of particles and radiation emanating from the Universe.

Nikhef coordinates and leads the Dutch experimental activities in these fields. The research at Nikhef relies on the development of innovative technologies. The knowledge and technology transfer to third parties, i.e., industry, civil society and general public, is an integral part of Nikhef's mission.

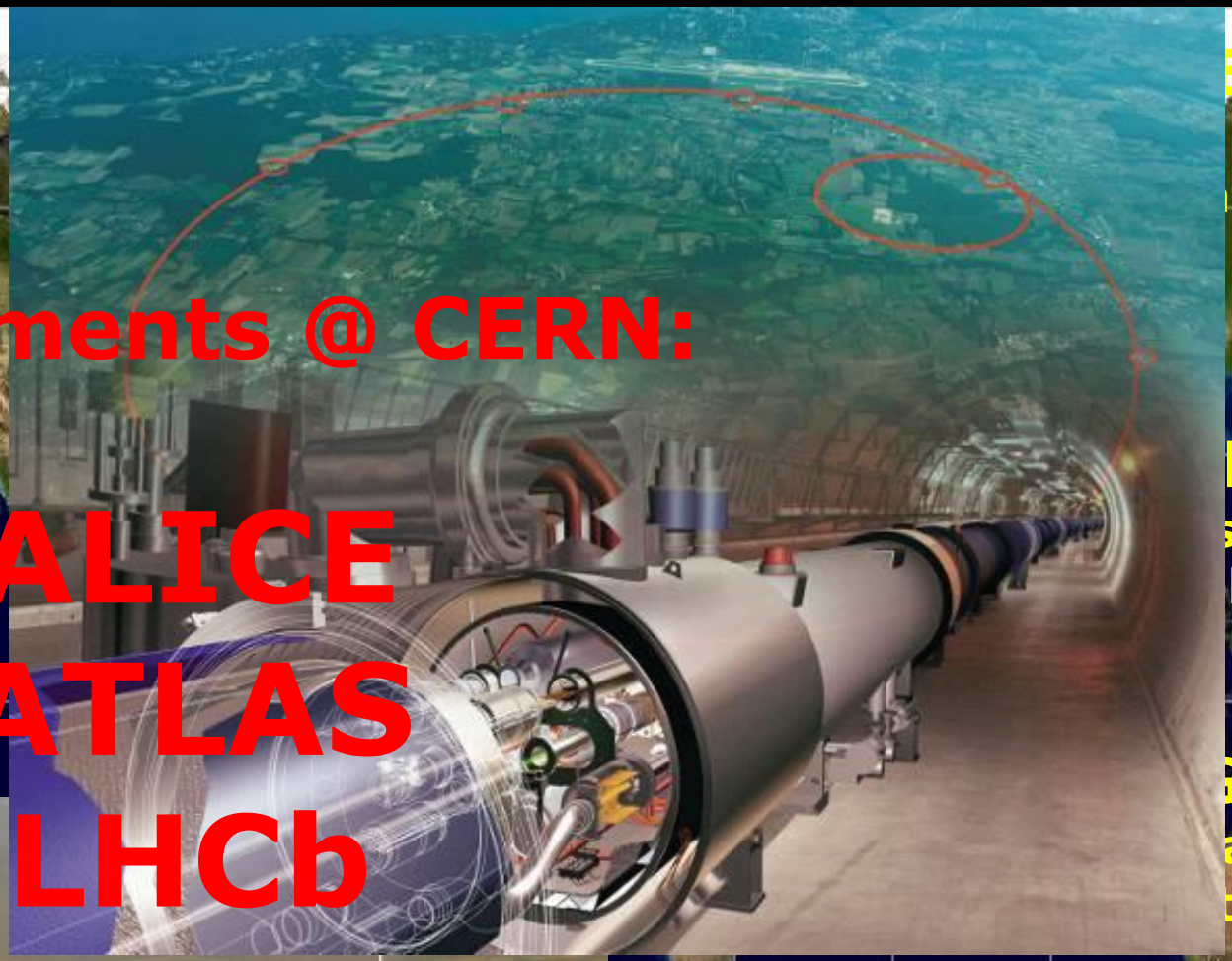
~300 people
~30 M€/year

	FOM	RU	UU	UvA	VU
ATLAS	••••	••		••	
LHCb	••••				••
ALICE	••••		•••		
ANTARES	••••		•	•	
AUGER	••	•			
VIRGO	••	•			••
XENON	•			•	
Theoretical Physics	••••	•	•	•	•
Detector R&D	••••				
Grid computing	•••				

NIKHEF

(selected) research questions

Nikhef research: *experiment*



Experiments @ CERN:

ALICE
ATLAS
LHCb

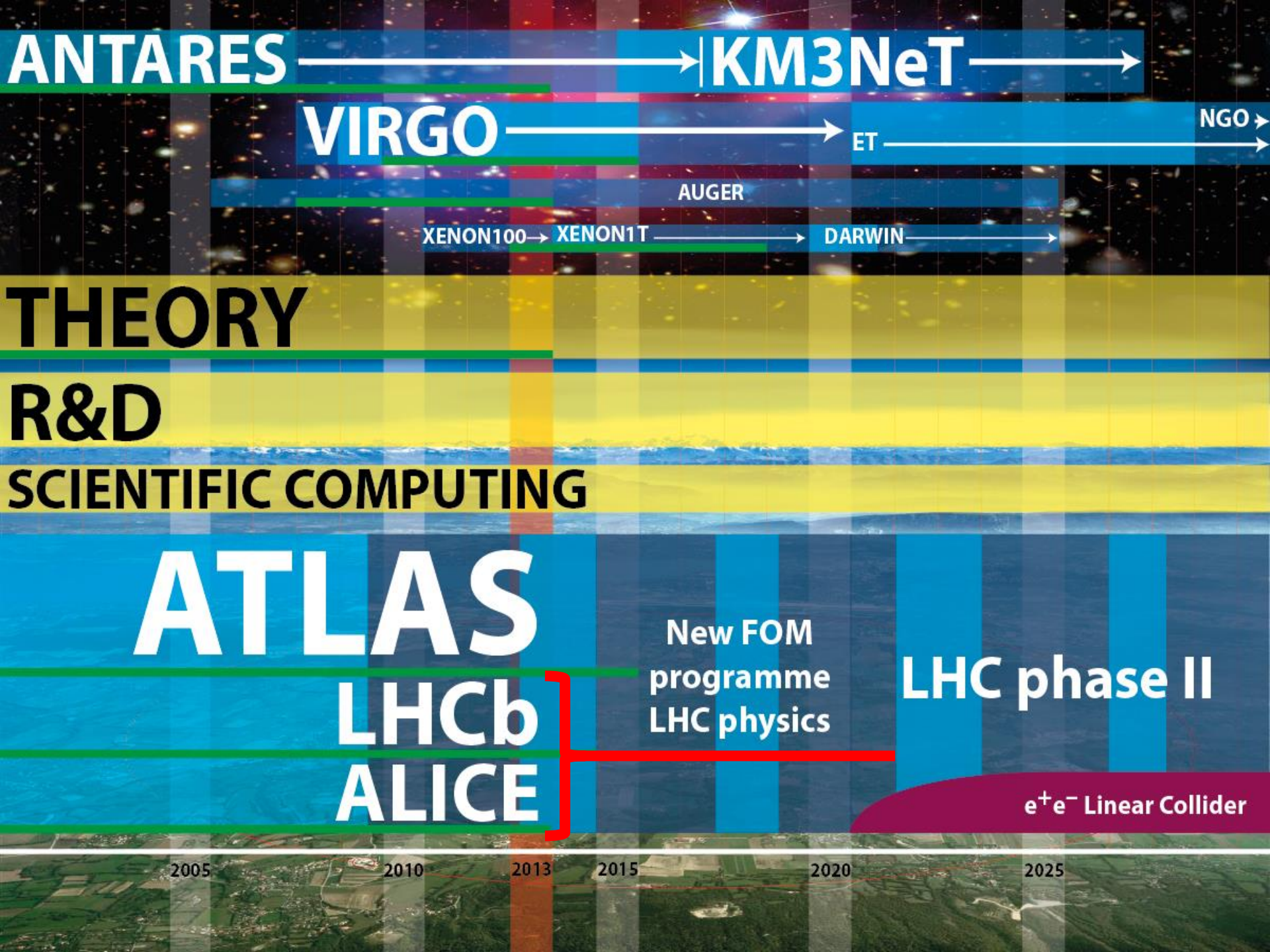
ER
ray
tory

KM3NeT
sea
lescope

GO
al-wave
tor

particle physics
erator-based particle physics

XENON-1t
deep-underground
dark matter detector

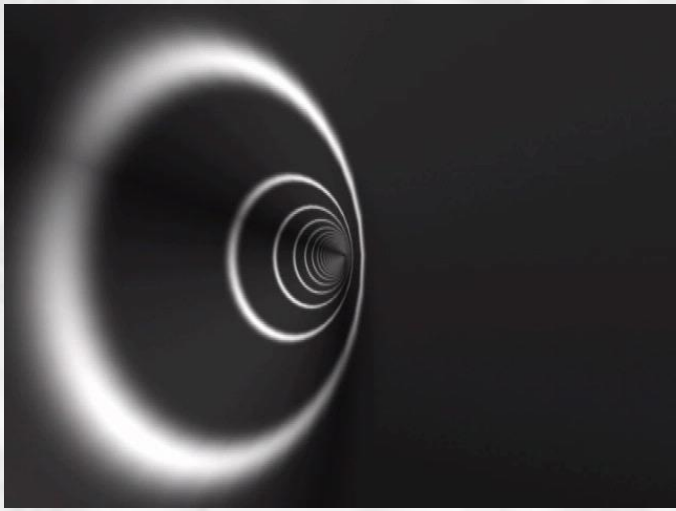

ANTARES
KM3NeT
VIRGO
ET
NGO
AUGER
XENON100
XENON1T
DARWIN
THEORY
R&D
SCIENTIFIC COMPUTING
ATLAS
LHCb
ALICE
New FOM programme LHC physics
LHC phase II
e+e− Linear Collider
2005
2010
2013
2015
2020
2025

CERN’s Large Hadron Collider: *ATLAS*

BIG GRID

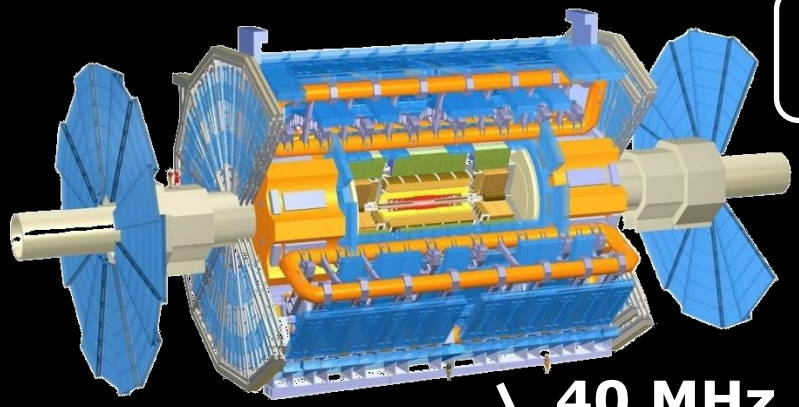
- Stichting **N**ationale **C**omputer **F**aciliteiten (NCF)
- **N**ederlands **B**io-**I**nformatica **C**entrum (NBIC)
- **N**ationaal **I**nstituut voor **K**ernfysica en **H**oge-**E**nergie **F**ysica (NIKHEF)

BIG GRID



The Dutch e-Science Grid

atlas detector



40 MHz

hardware

100 GB/s

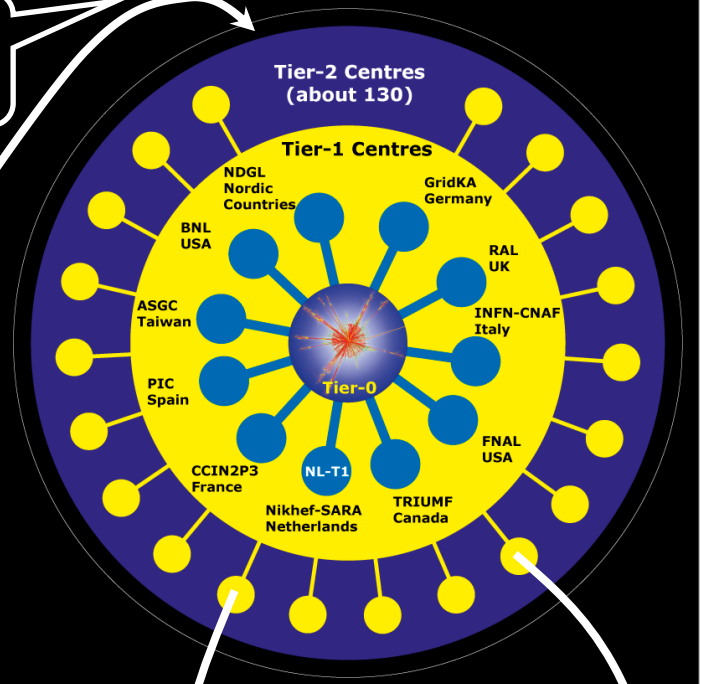
software

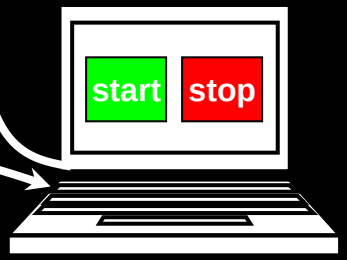
10 GB/s

CPU farm

1 GB/s

physics data
1 GB/s





control room

analysis

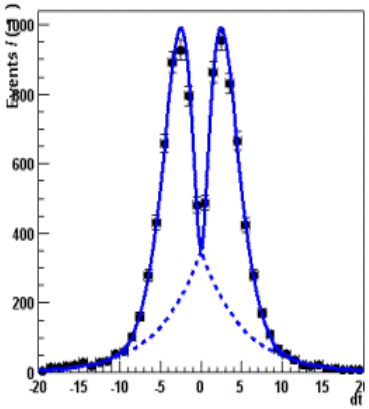
The RooFit Toolkit for Data Modeling

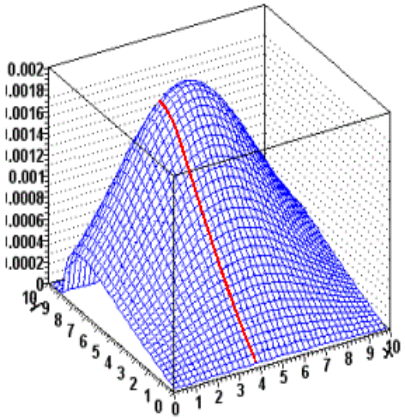
The RooFit packages provide a toolkit for modeling the expected distribution of events in a physics analysis. Models can be used to perform likelihood fits, produce plots, and generate "toy Monte Carlo" samples for various studies. The RooFit tools are integrated with the object-oriented and interactive ROOT graphical environment.

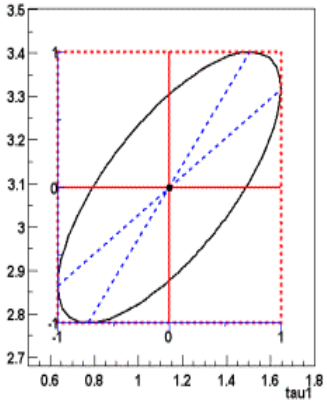
RooFit has been developed for the BaBar collaboration, a high energy physics experiment at the Stanford Linear Accelerator Center, and is primarily targeted to the high-energy physicists using the ROOT analysis environment, but the general nature of the package make it suitable for adoption in different disciplines as well.

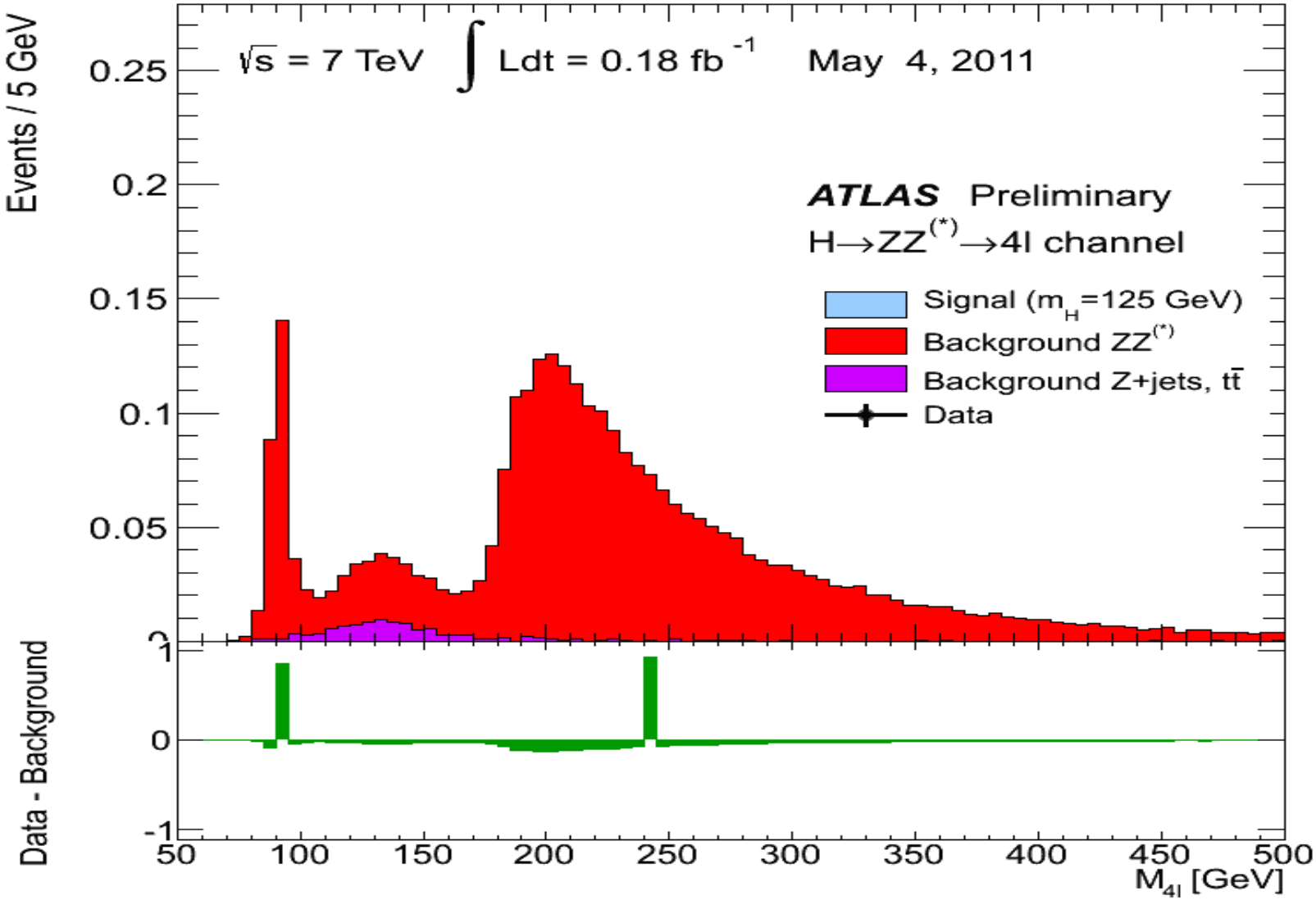
Quick Tour

For a quick overview of what RooFit can do, have a look at the PHYSTAT2005 write-up on RooFit (here), or download the Users Manual (here), or have a look at our (now slightly outdated) 10 page RooFit web slide show.








√s = 7 TeV ∫ Ldt = 0.18 fb⁻¹ May 4, 2011
ATLAS Preliminary
H→ZZ(*)→4l channel
Signal (mH=125 GeV)
Background ZZ(*)
Background Z+jets, tt̄
Data
Events / 5 GeV
Data - Background
M4l [GeV]

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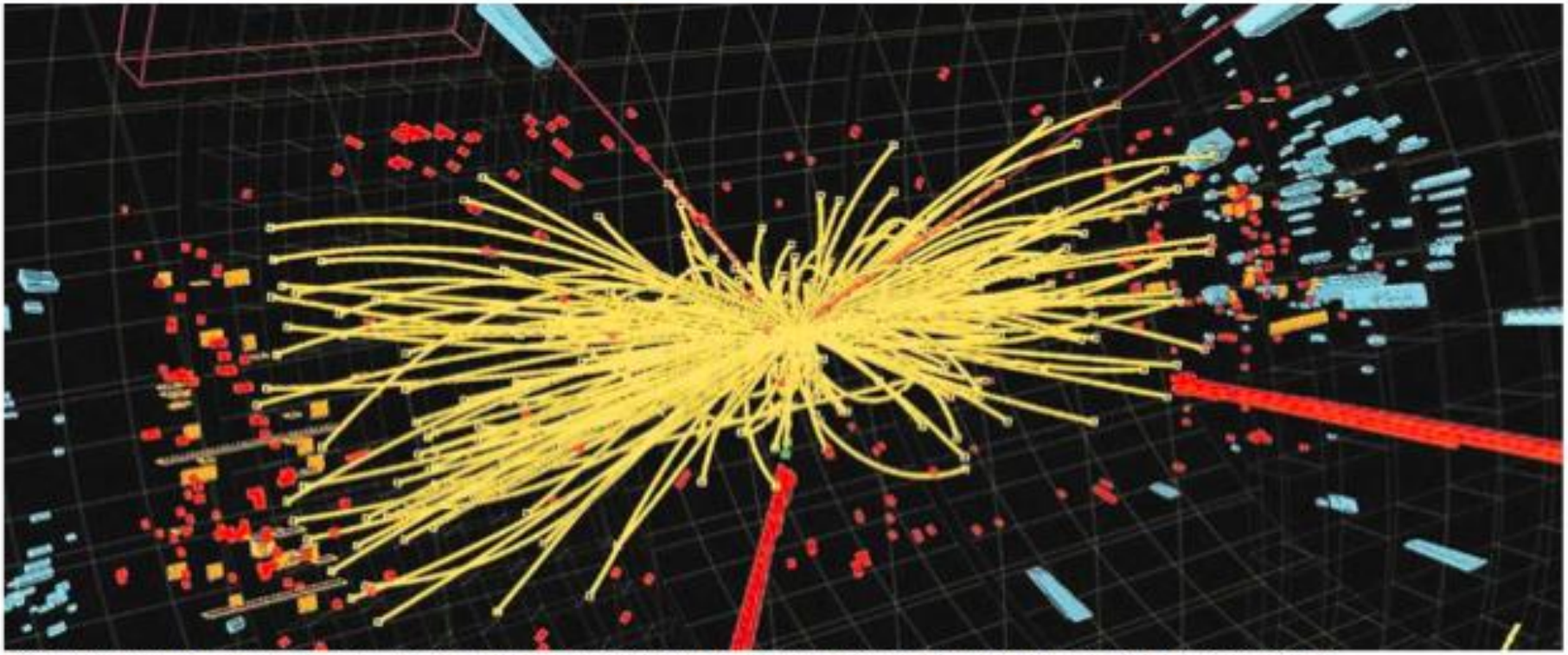
NRC HANDELSBLAD

Woensdag 4 juli 2012 Jaargang 42 no.233 Algemeen Handelsblad (1828) en Nieuwe Rotterdamsche Courant (1844) Prijs € 2,-

Kairo is synoniem met seksueel geweld
buitenland 10

Pininfarina gaf Ferrari een gezicht
het grote verhaal 12-13

Afstudeerfilms: lelijke kinderen, dolende zielen
film 18-19



Grafische weergave van de sporen van een proton-protonbotsing in een van de deeltjesdetectoren van CERN, het deeltjesversnellerinstituut bij Genève. Foto AFP / CERN

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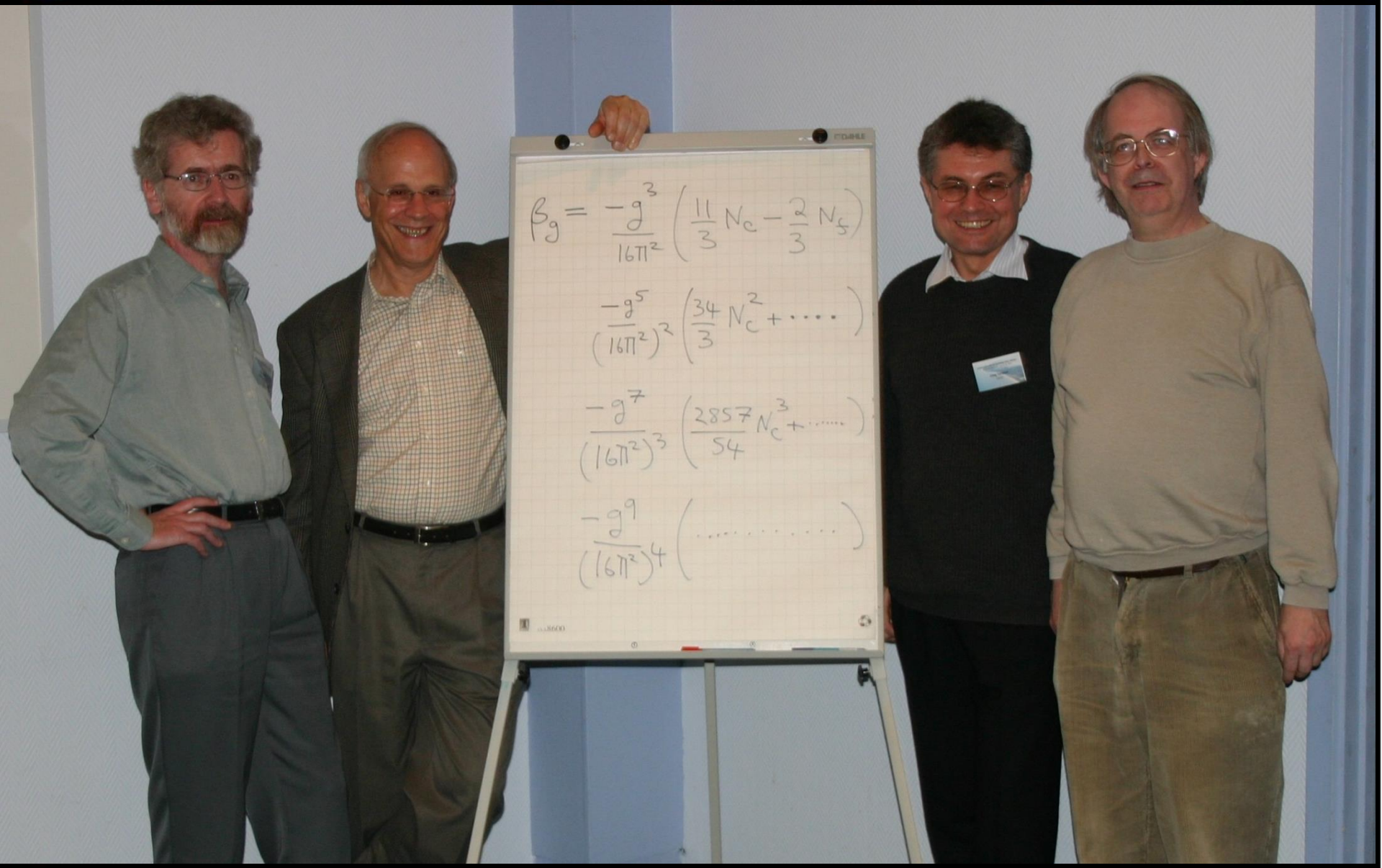
$\beta_g = \frac{-g^3}{16\pi^2}\left(\frac{11}{3}N_c - \frac{2}{3}N_f\right)$
$\frac{-g^5}{(16\pi^2)^2}\left(\frac{34}{3}N_c^2 + \cdots\right)$
$\frac{-g^7}{(16\pi^2)^3}\left(\frac{2857}{54}N_c^3 + \cdots\right)$
$\frac{-g^9}{(16\pi^2)^4}\left(\cdots\right)$

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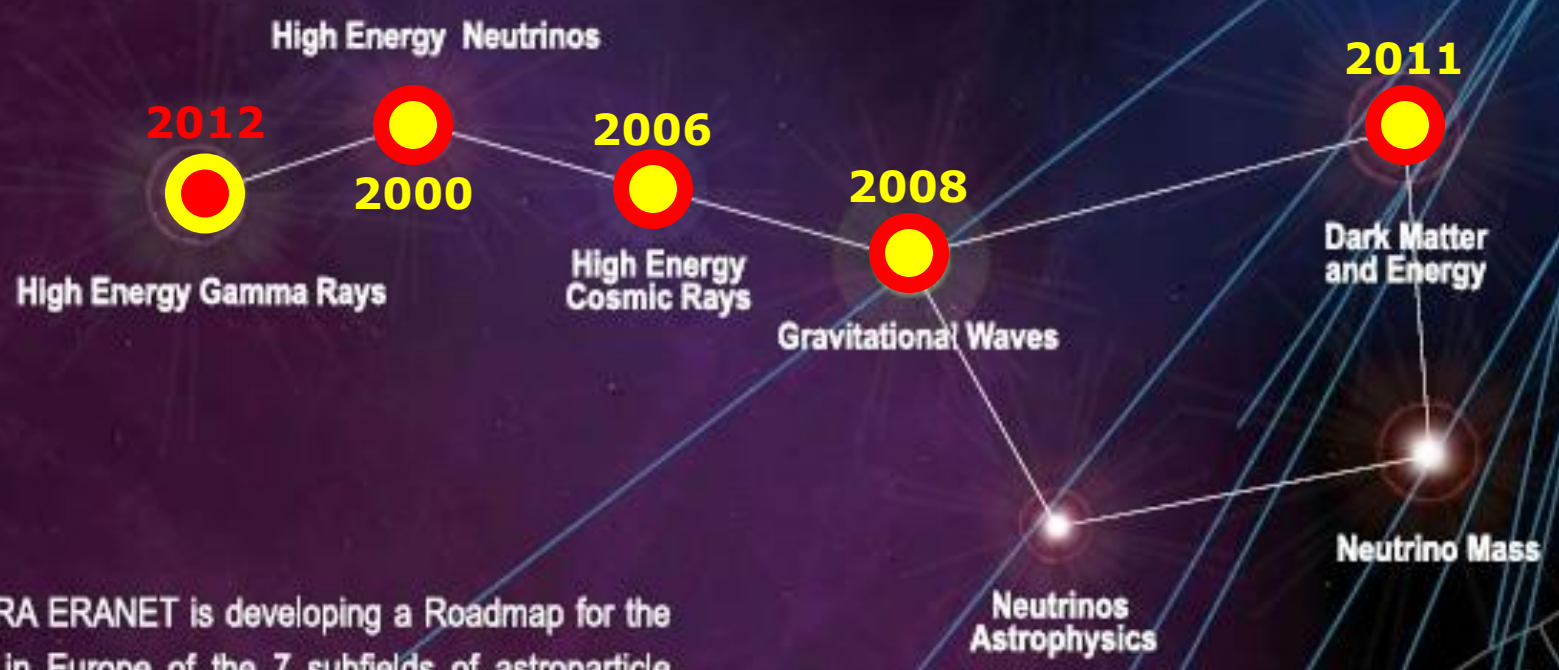
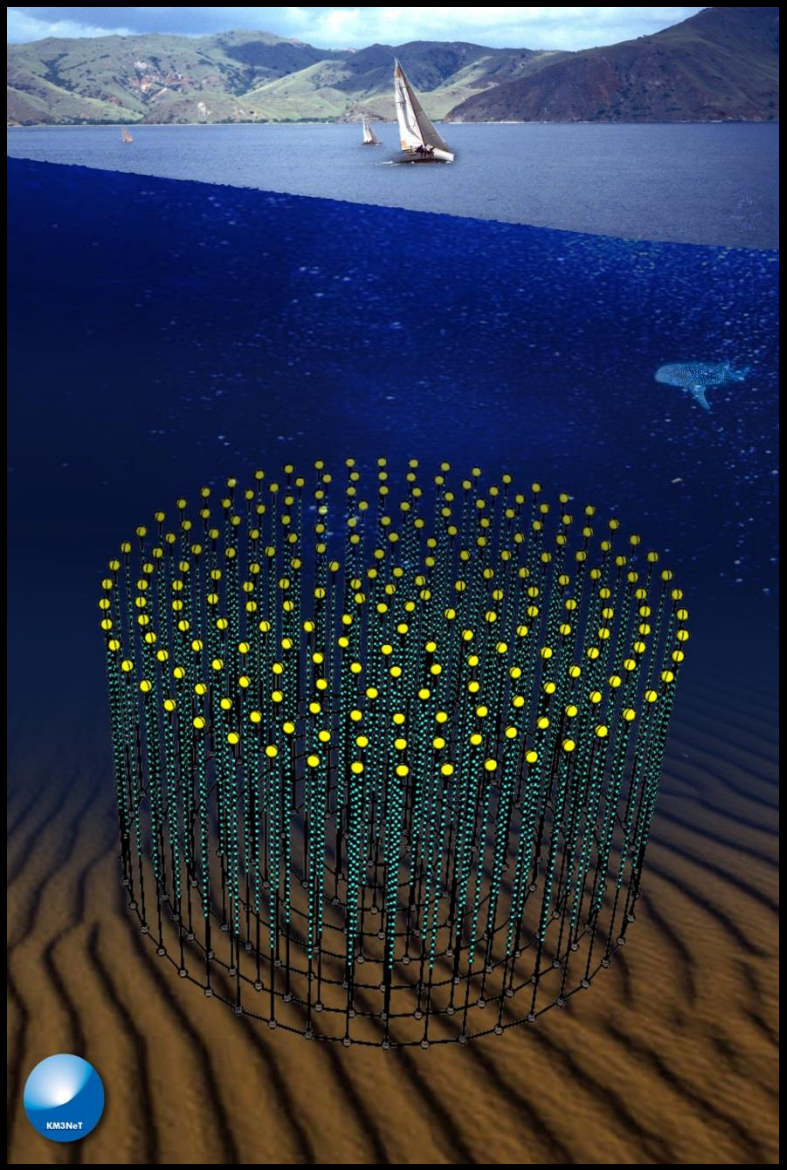
European Priorities in Astroparticle Physics

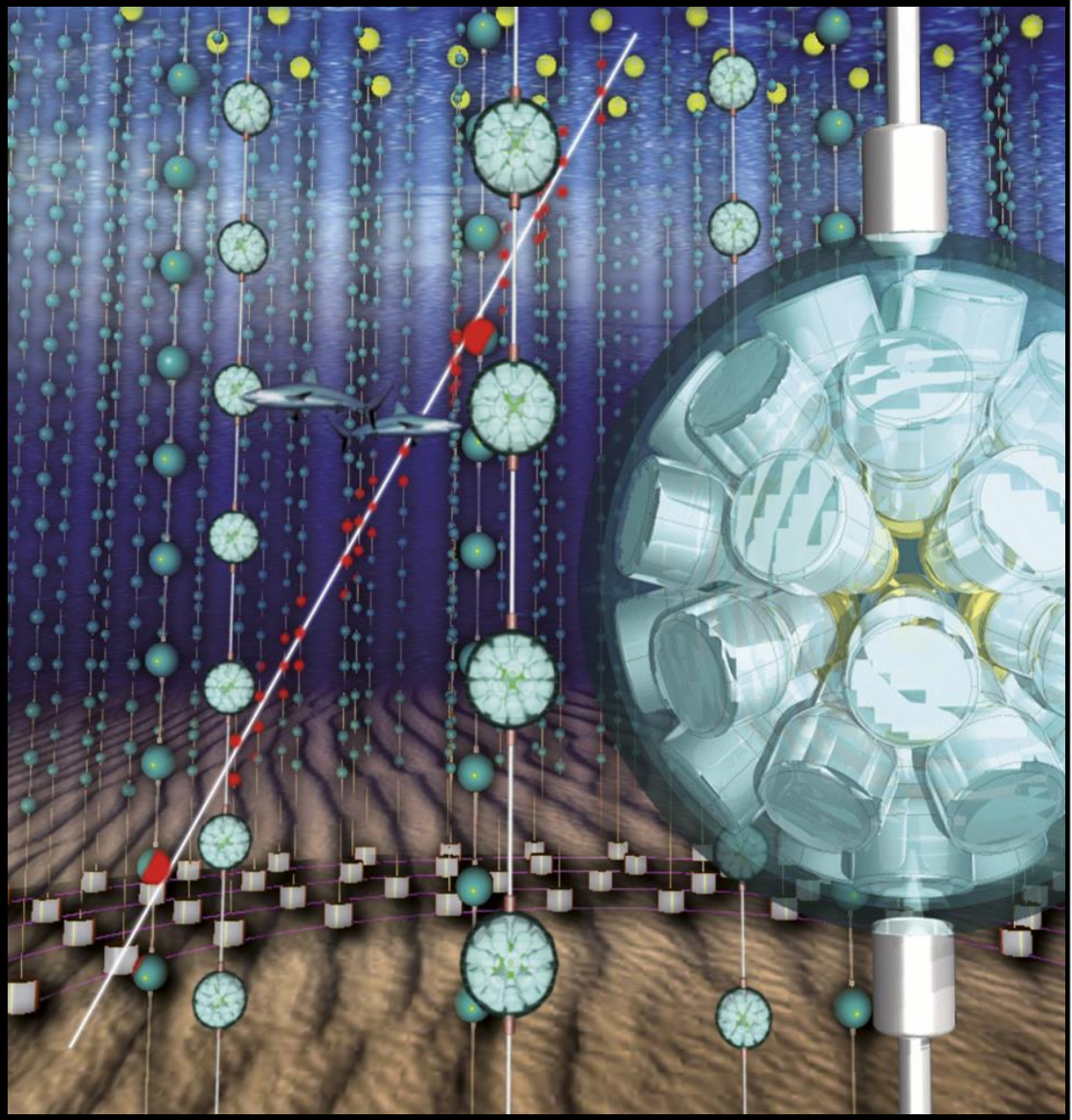
BRUSSELS 29 - 30 September 2008



ASPERA ERANET is developing a Roadmap for the future in Europe of the 7 subfields of astroparticle physics. They aim to probe the mysteries of dark matter and energy, reveal the picture of the high-energy Universe, solve the secret origin of cosmic rays...

NEMO AMSTERDAM


KM3NeT



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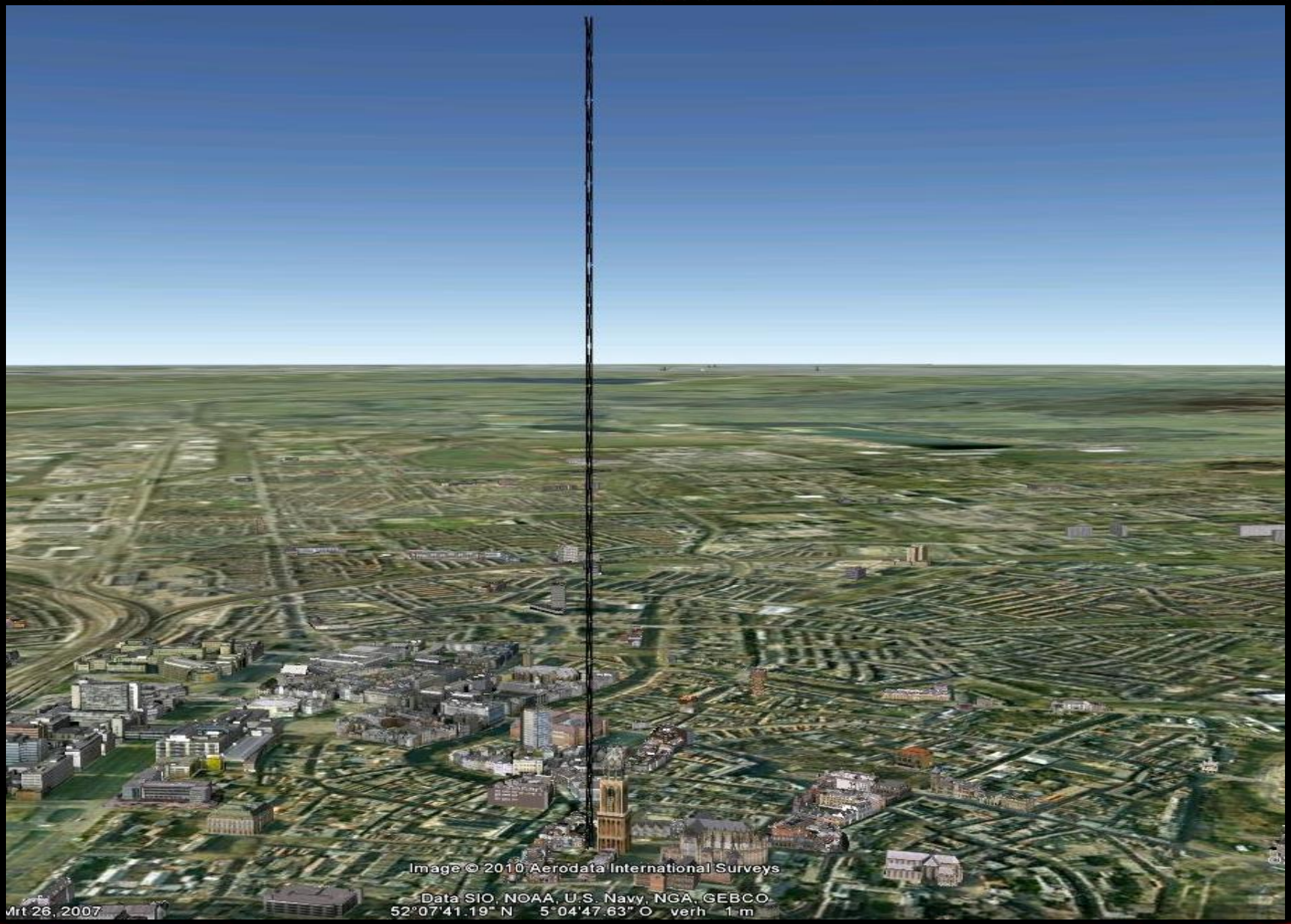
Image © 2010 Aerodata International Surveys
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
52°07'41.19" N 5°04'47.63" O verh 1 m
Mrt 26, 2007

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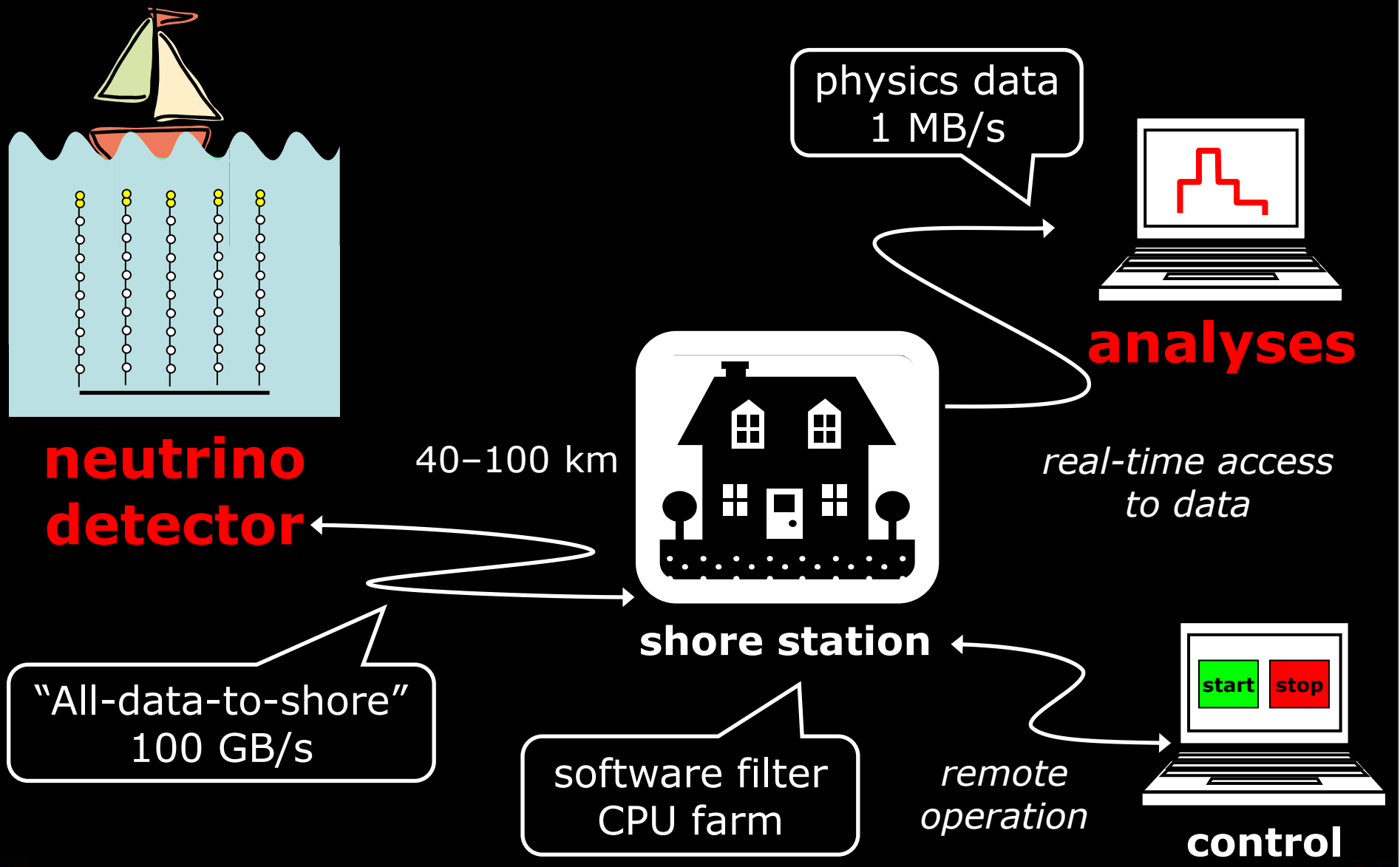
physics data
1 MB/s
analyses
neutrino
detector
40–100 km
real-time access
to data
shore station
"All-data-to-shore"
100 GB/s
software filter
CPU farm
remote
operation
start
stop
control

≥1986 ≥1990 ≥1994 ≥2007 ≥2010

ICT:

TERENA

RIPE NCC

amsix amsterdam internet exchange

BiG Grid the dutch e-science grid

egi

≥ 1986

ASML

Industry:

HADRON

PHILIPS sense and simplicity

≥ 2000

PANalytical

Start-ups:

Sensiflex

ASI

≥ 2010

efficient information exchange → world wide web

```
                    WWW - World Wide Web at NIKHEF
              NIKHEF INFORMATION
Help [1]      About this program, and the World-Wide Web
NIKHEF [2]    NIKHEF information
CERN [3]      CERN Information, ftp access to file server asis01.cern.ch [4]
HEP [5]       High Energy Physics
WWW [6]       The home page of WWW on info.cern.ch
  [End]
1-7, Quit, or Help: 2
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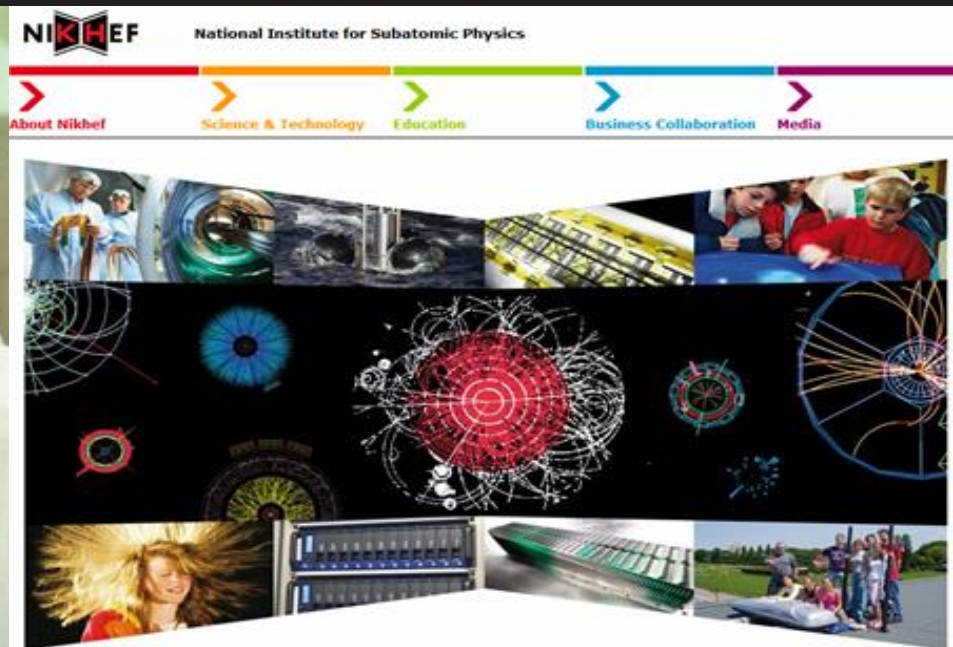

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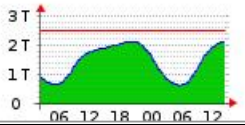
ASNs	Ports	Peak (Gb/s)	Cur (Gb/s)	Capacity (Gb/s)
612	1166	2497	2159	9904



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2012

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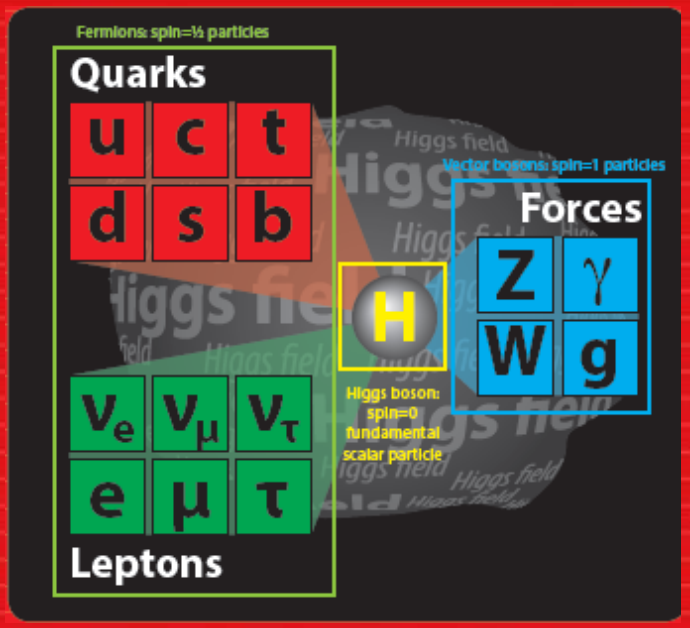
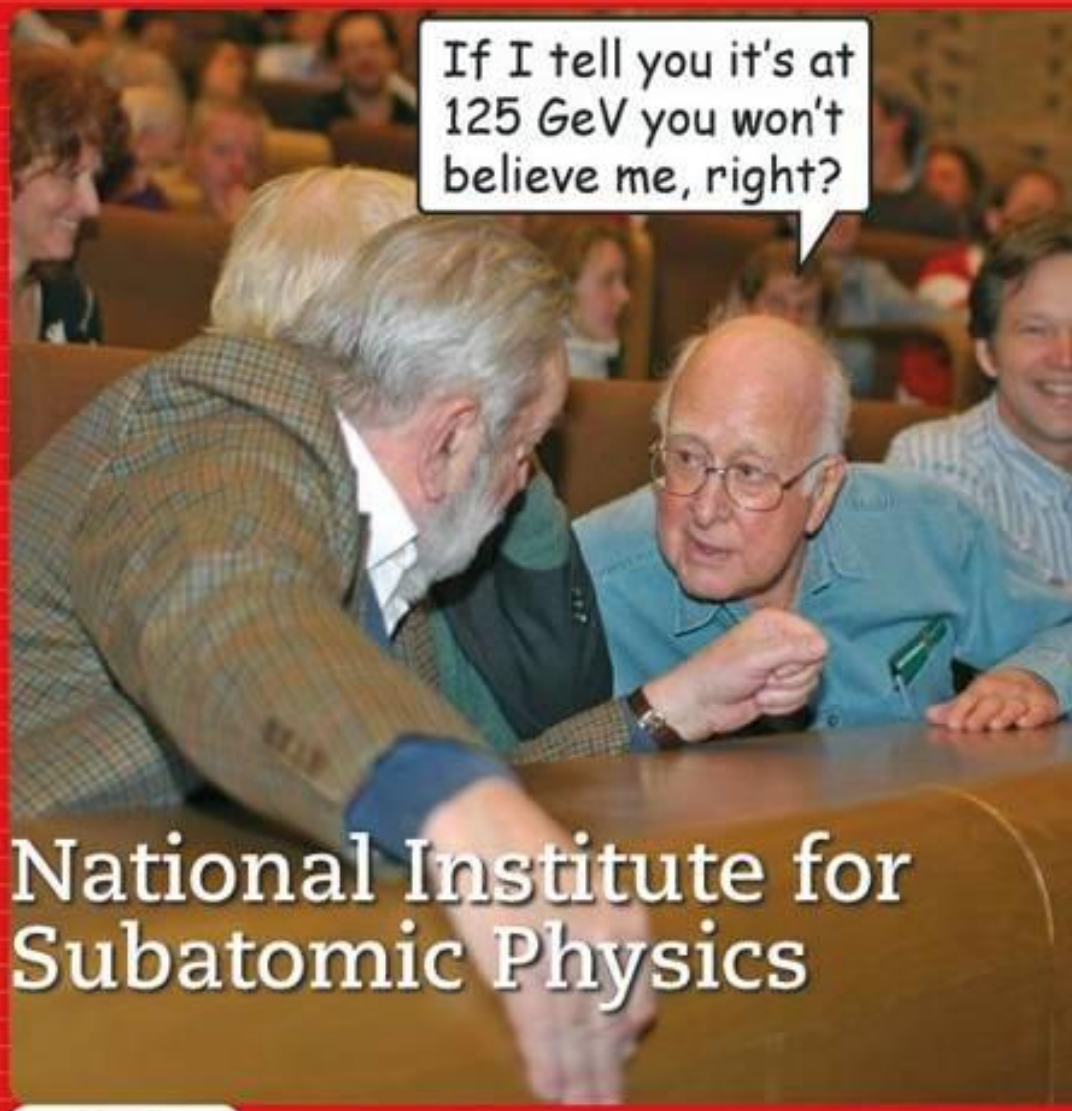
X-ray Company



Annual Report 2011 · Nikhef

Annual Report 2011

Nikhef



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