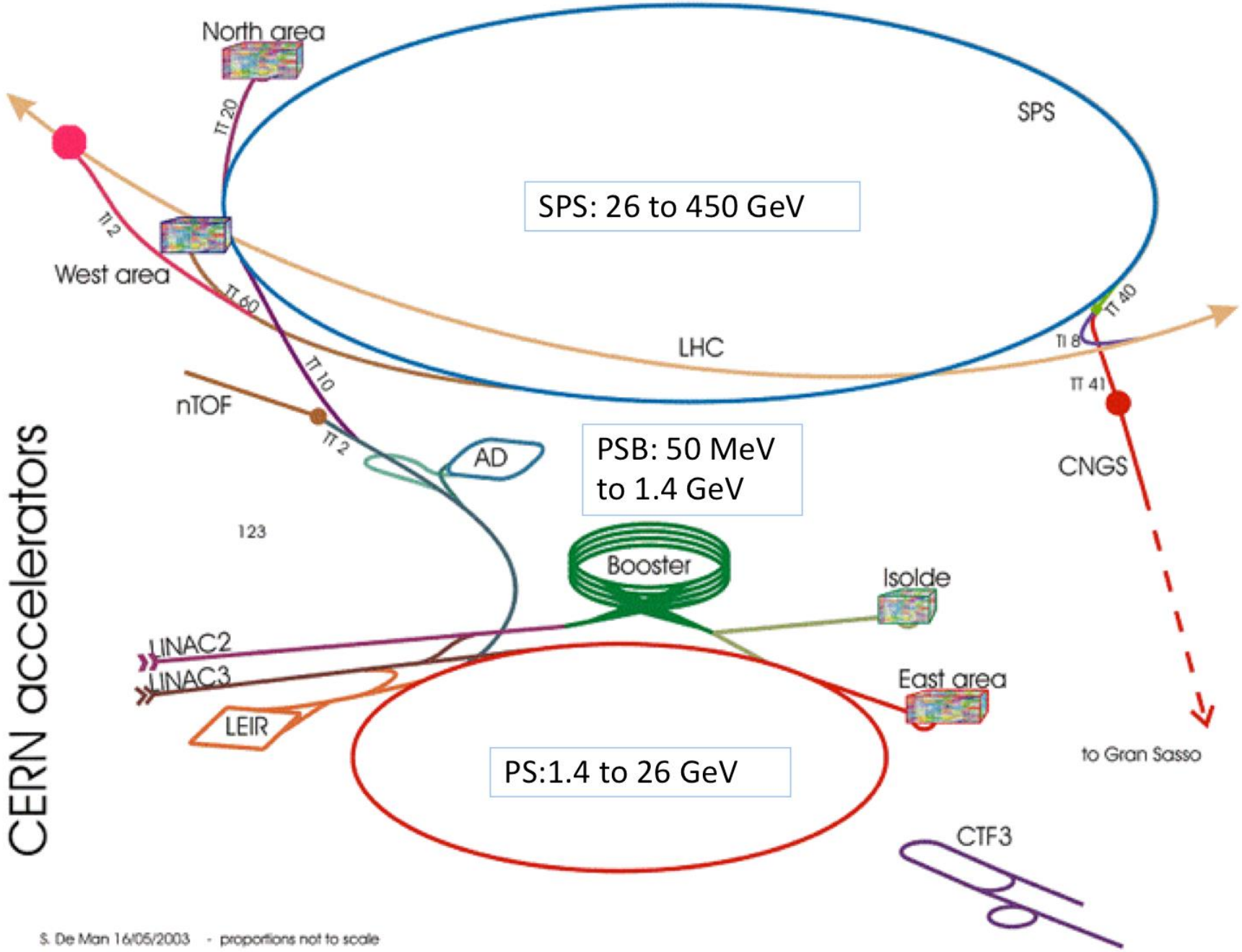
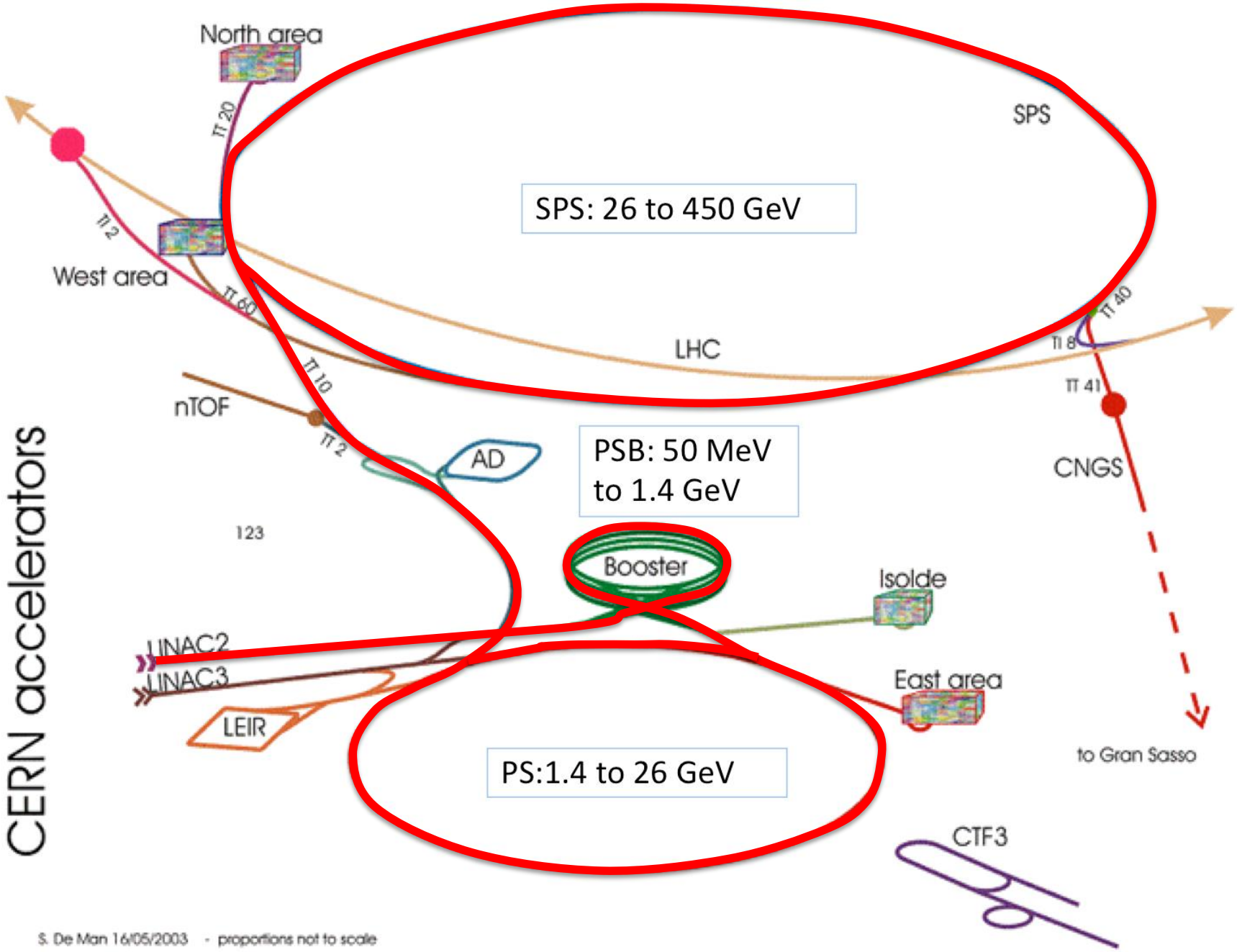
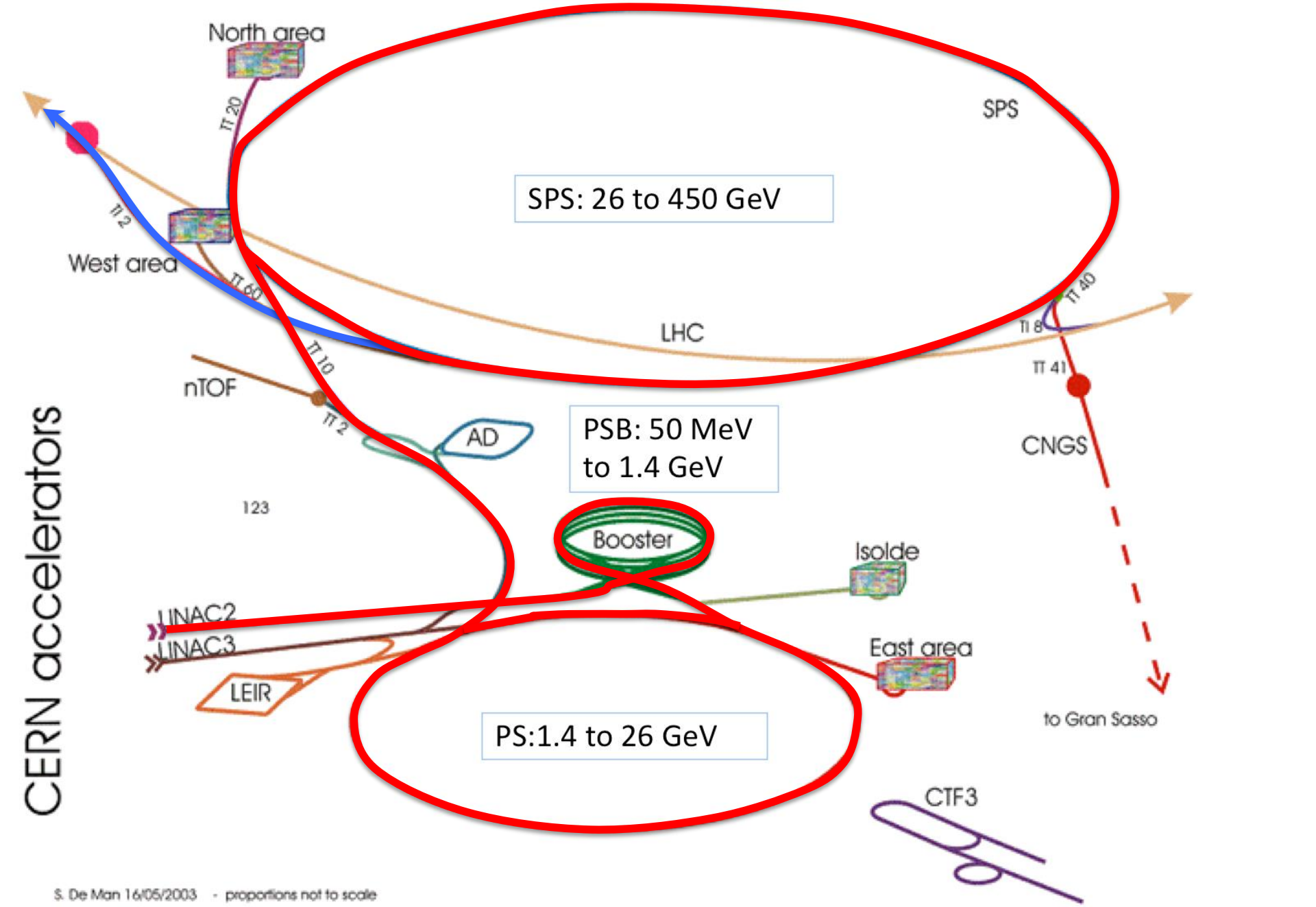
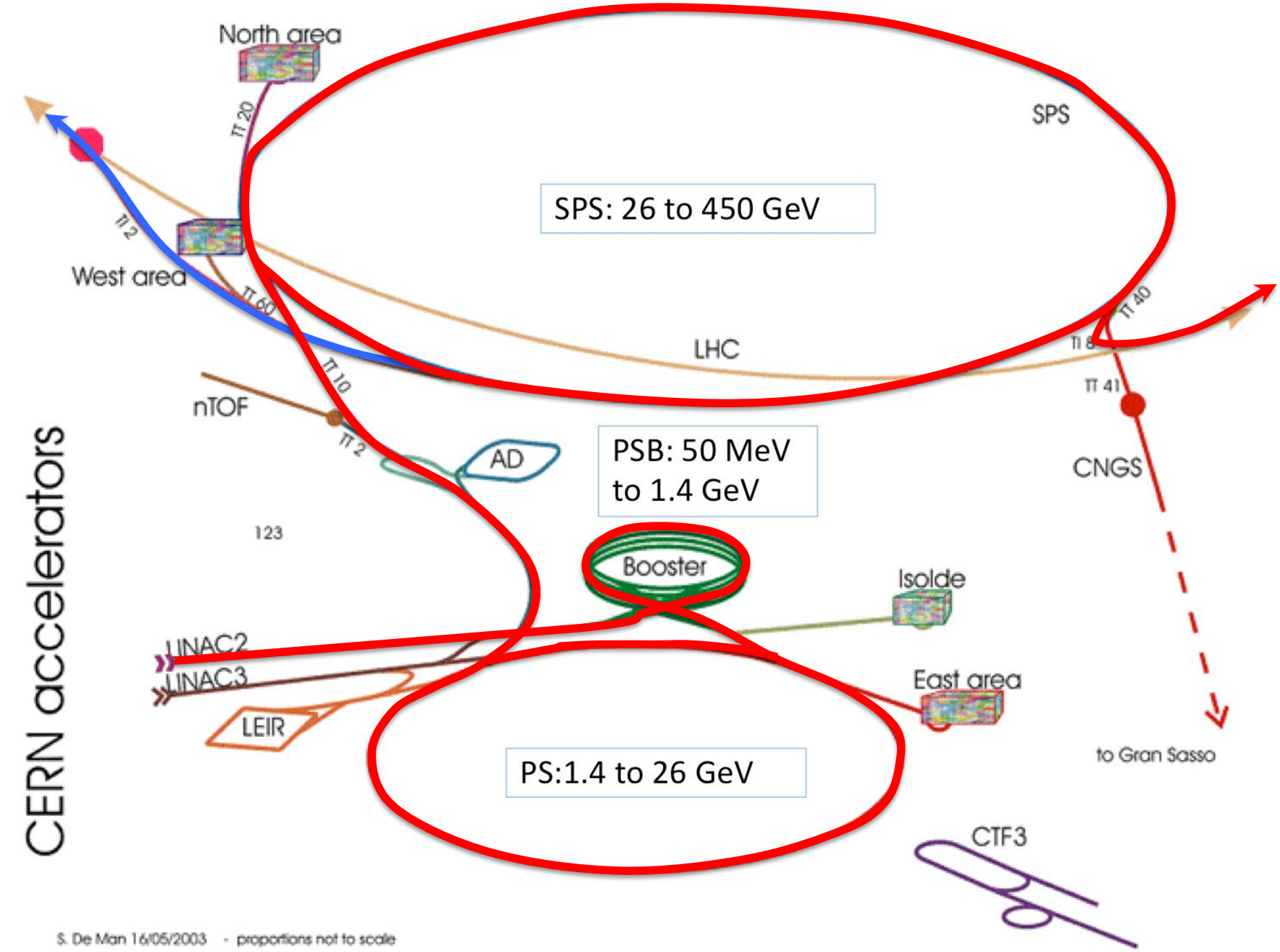
On behalf of CERN management – welcome to Murren

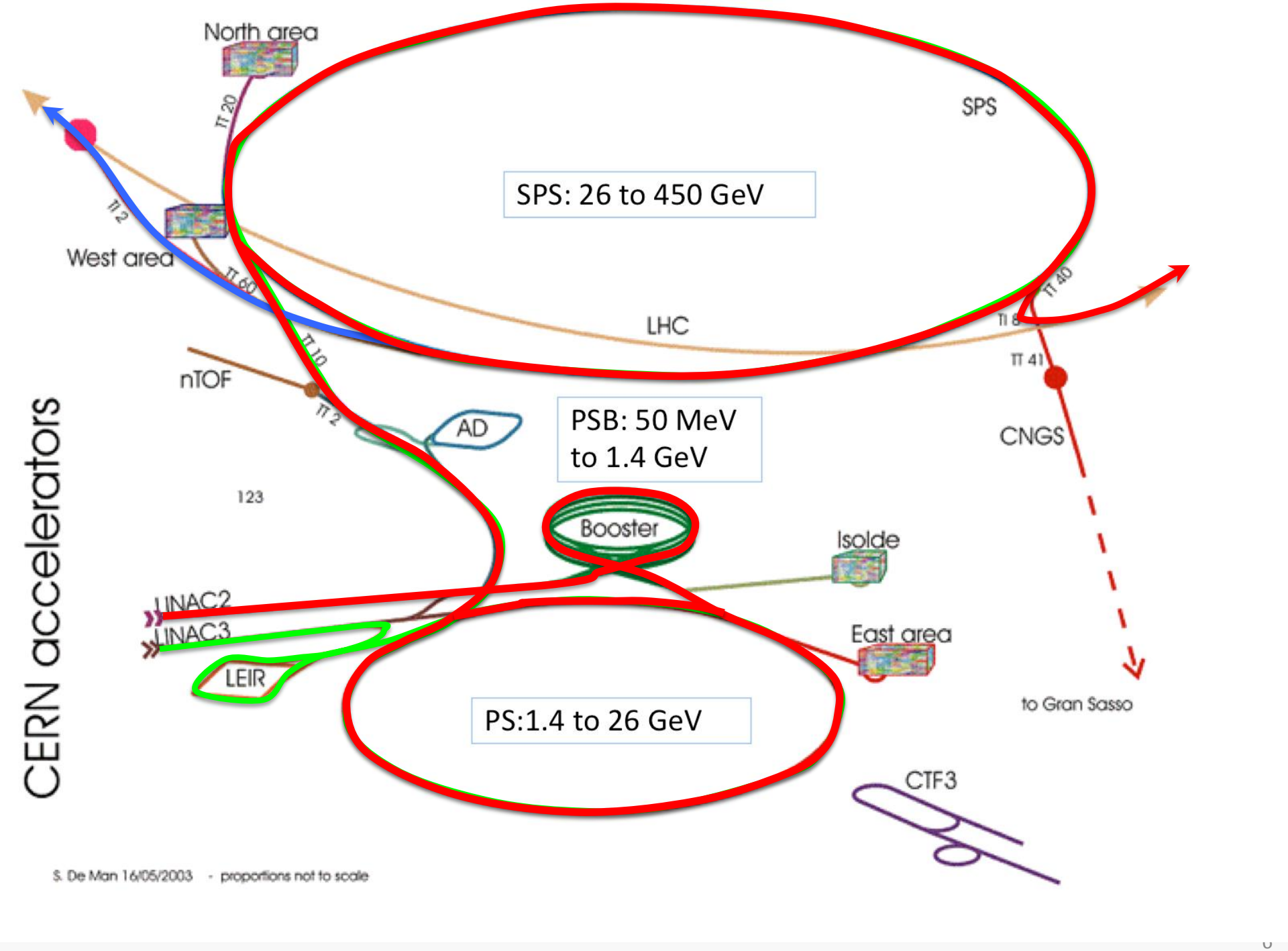
While you're here, please be sure to visit our two cyclotrons

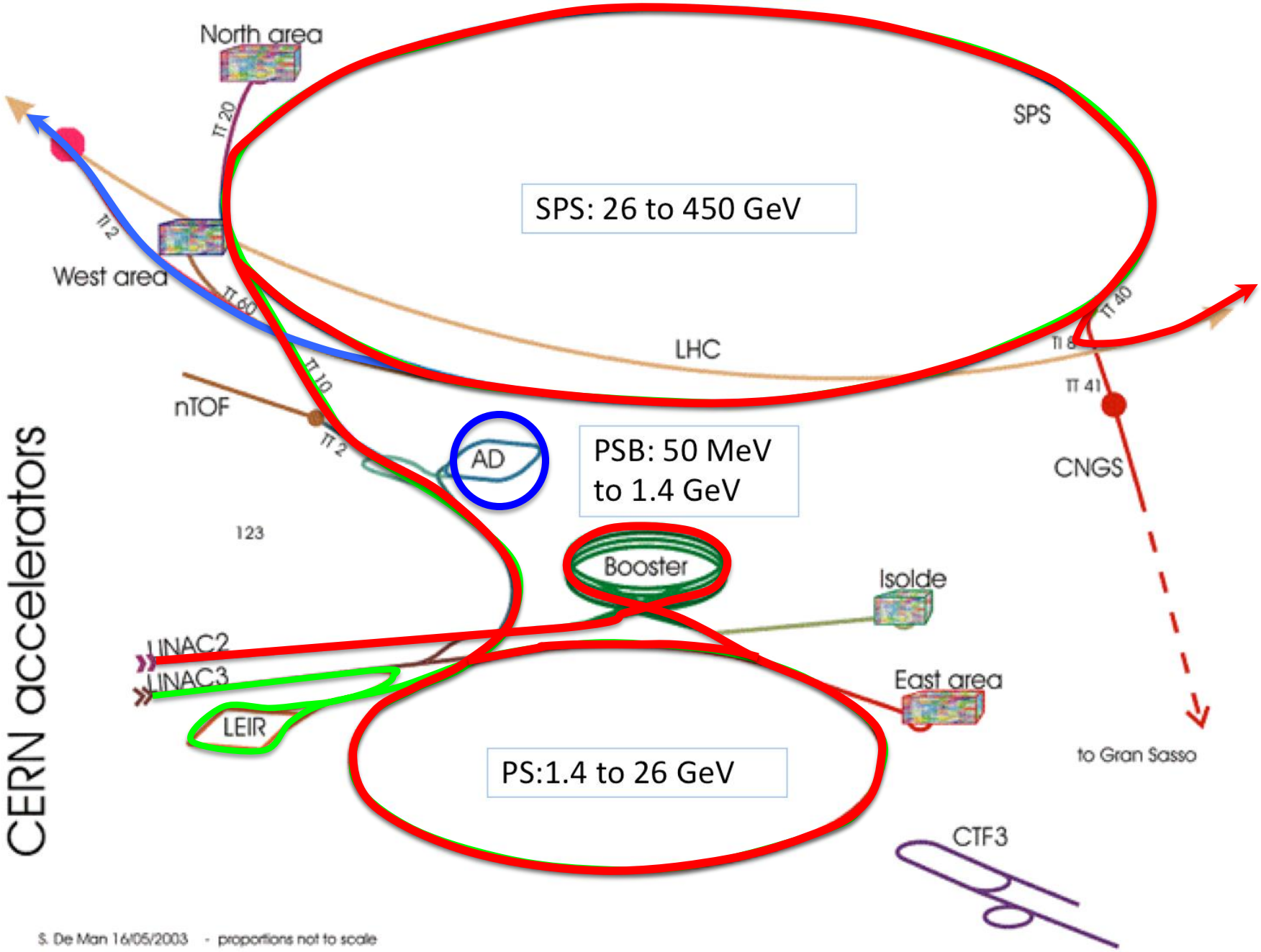

CERN accelerators
North area
TT 20
SPS
SPS: 26 to 450 GeV
TI 2
West area
TT 60
TT 40
TI 8
LHC
TT 10
TT 41
nTOF
TT 2
AD
PSB: 50 MeV
to 1.4 GeV
CNGS
123
Booster
Isolde
LINAC2
LINAC3
East area
LEIR
PS:1.4 to 26 GeV
to Gran Sasso
CTF3
S. De Man 16/05/2003 - proportions not to scale

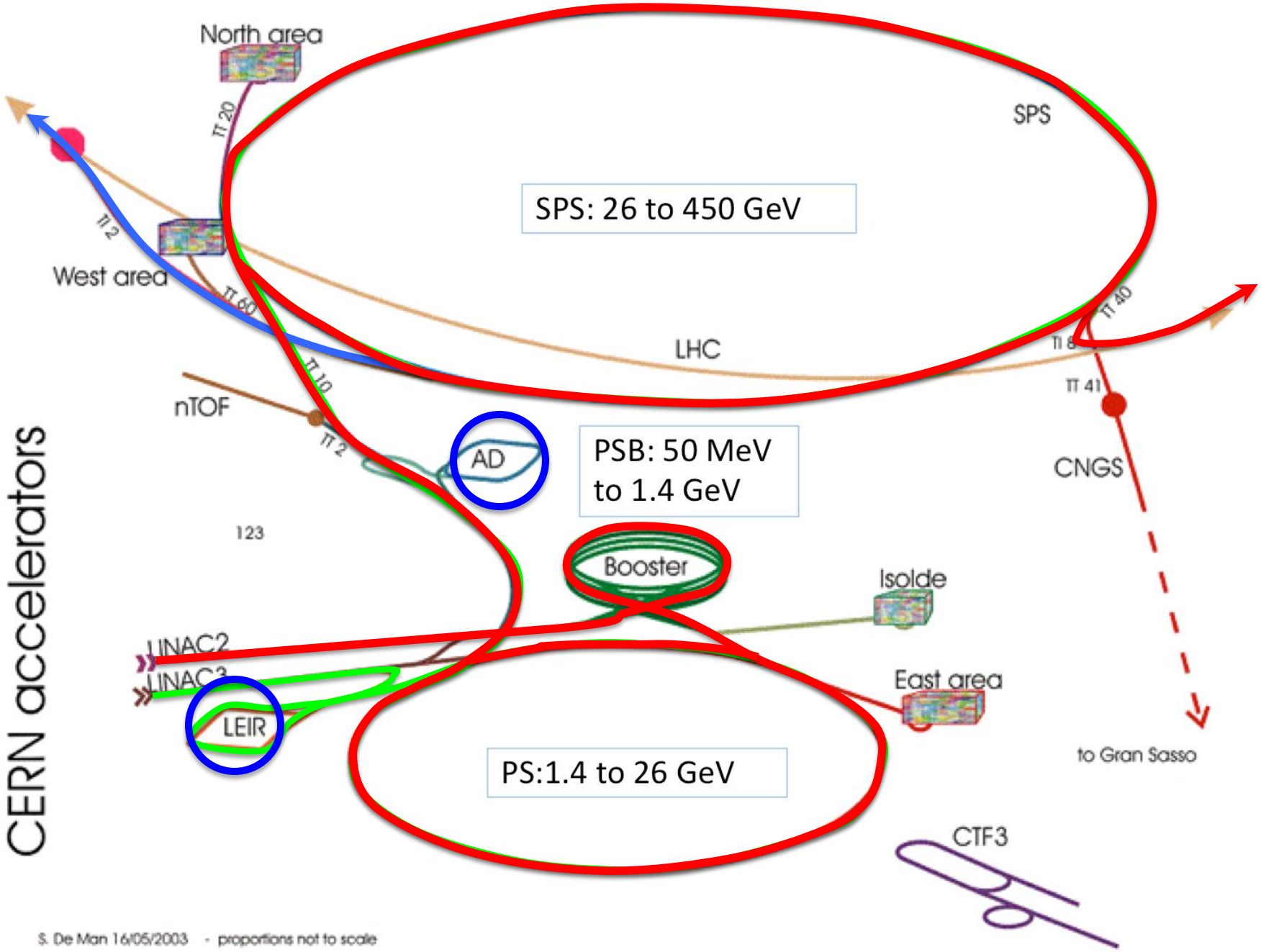

North area
TT 20
TI 2
West area
TT 60
TT 10
nTOF
TT 2
AD
123
SPS
SPS: 26 to 450 GeV
LHC
TT 40
TI 8
TT 41
CNGS
PSB: 50 MeV
to 1.4 GeV
Booster
Isolde
LINAC2
LINAC3
LEIR
East area
PS:1.4 to 26 GeV
to Gran Sasso
CTF3
CERN accelerators
S. De Man 16/05/2003 - proportions not to scale

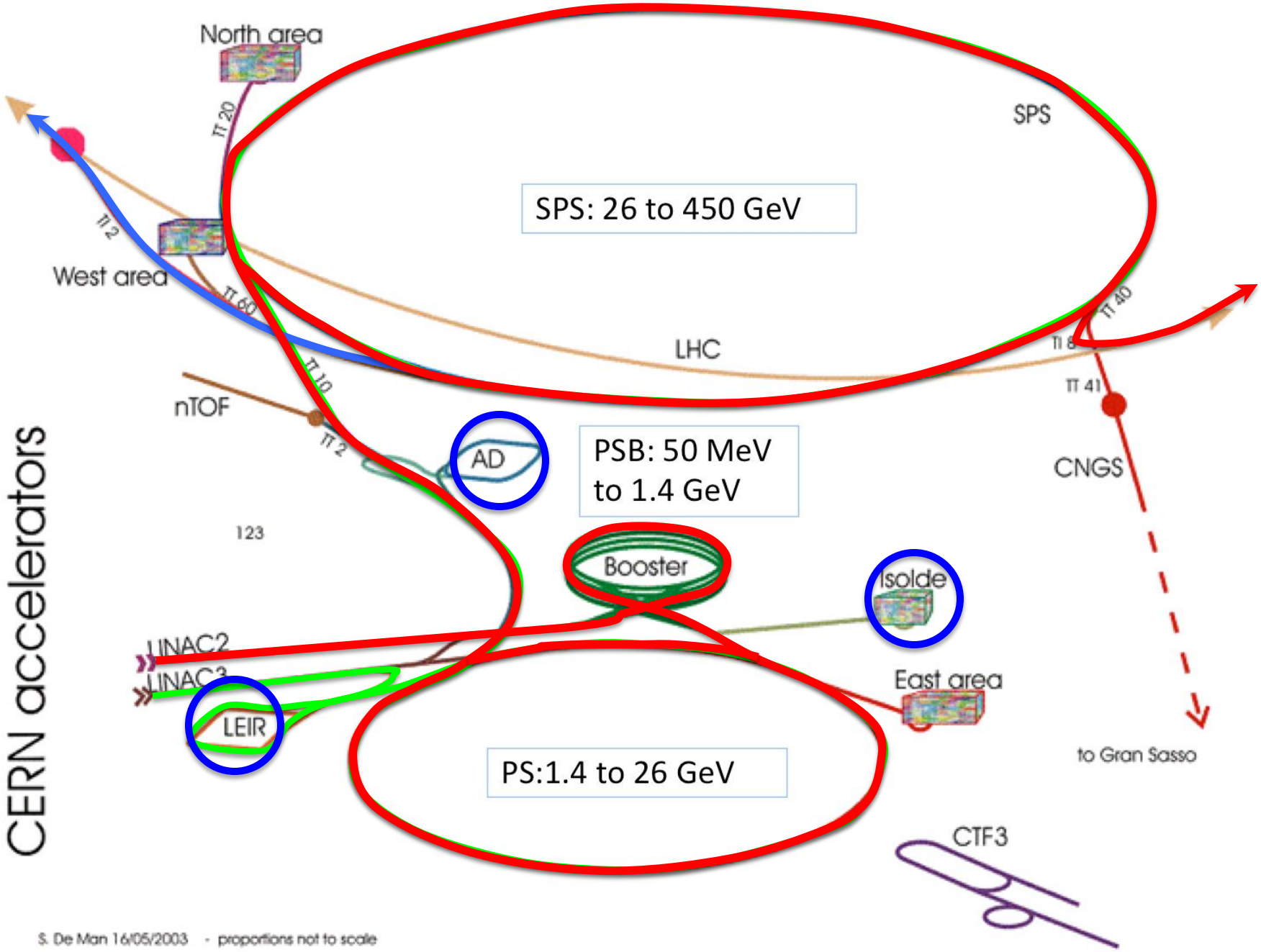

North area
TT 20
SPS
SPS: 26 to 450 GeV
TI 2
West area
TT 60
LHC
TT 40
TI 8
TT 10
TT 41
nTOF
TT 2
AD
PSB: 50 MeV
to 1.4 GeV
CNGS
123
Booster
Isolde
LINAC2
LINAC3
East area
LEIR
PS:1.4 to 26 GeV
to Gran Sasso
CTF3
CERN accelerators
S. De Man 16/05/2003 - proportions not to scale

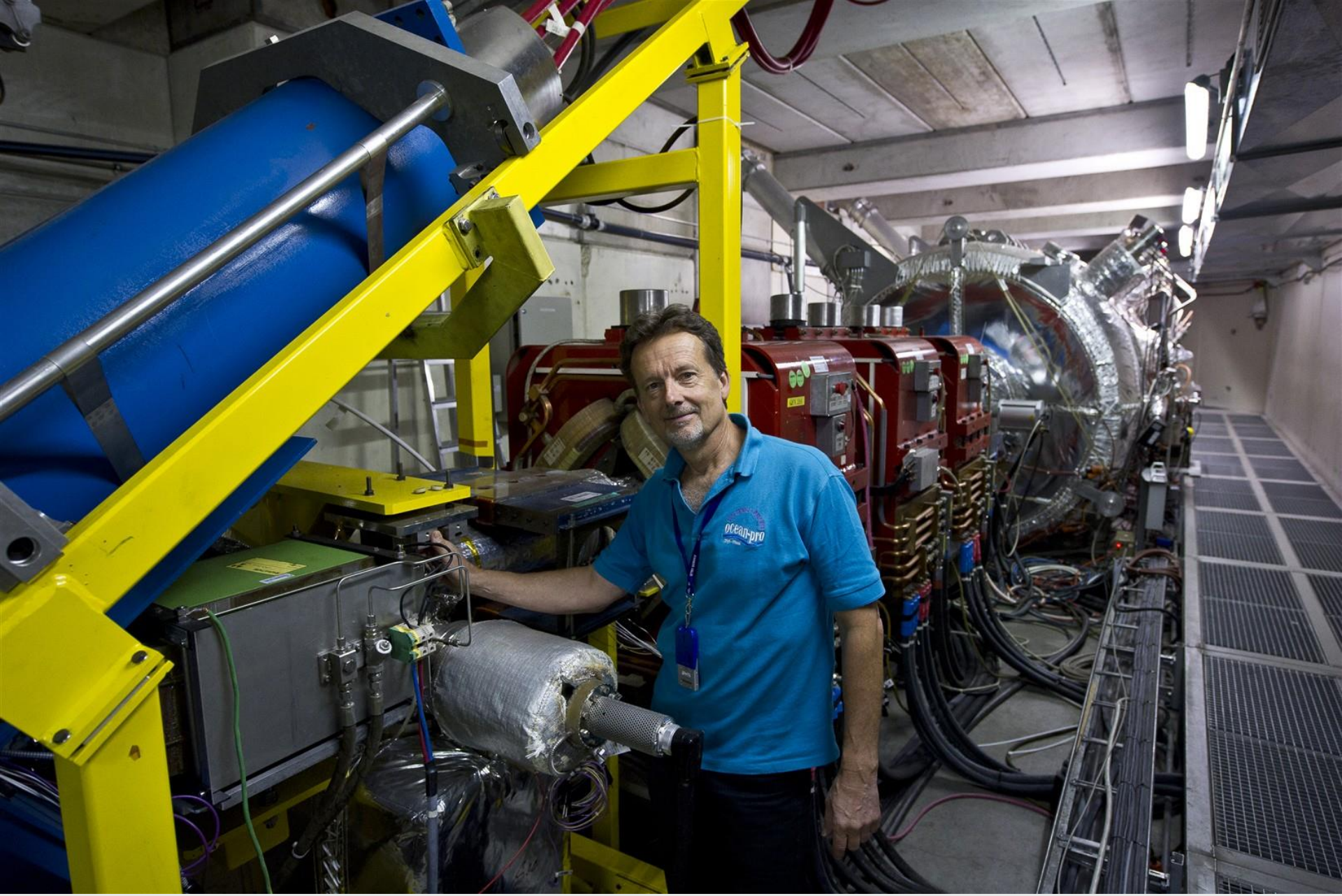

North area
TT 20
SPS
SPS: 26 to 450 GeV
TI 2
West area
TT 60
LHC
TT 40
TI 8
TT 41
TT 10
nTOF
TT 2
AD
PSB: 50 MeV
to 1.4 GeV
CNGS
123
Booster
Isolde
LINAC2
LINAC3
East area
LEIR
PS:1.4 to 26 GeV
to Gran Sasso
CTF3
CERN accelerators
S. De Man 16/05/2003 - proportions not to scale


CERN accelerators
North area
TT 20
SPS
SPS: 26 to 450 GeV
TI 2
West area
TT 60
LHC
TT 40
TI 8
TT 10
TT 41
nTOF
TT 2
AD
PSB: 50 MeV
to 1.4 GeV
CNGS
123
Booster
Isolde
LINAC2
LINAC3
East area
LEIR
PS:1.4 to 26 GeV
to Gran Sasso
CTF3
S. De Man 16/05/2003 - proportions not to scale

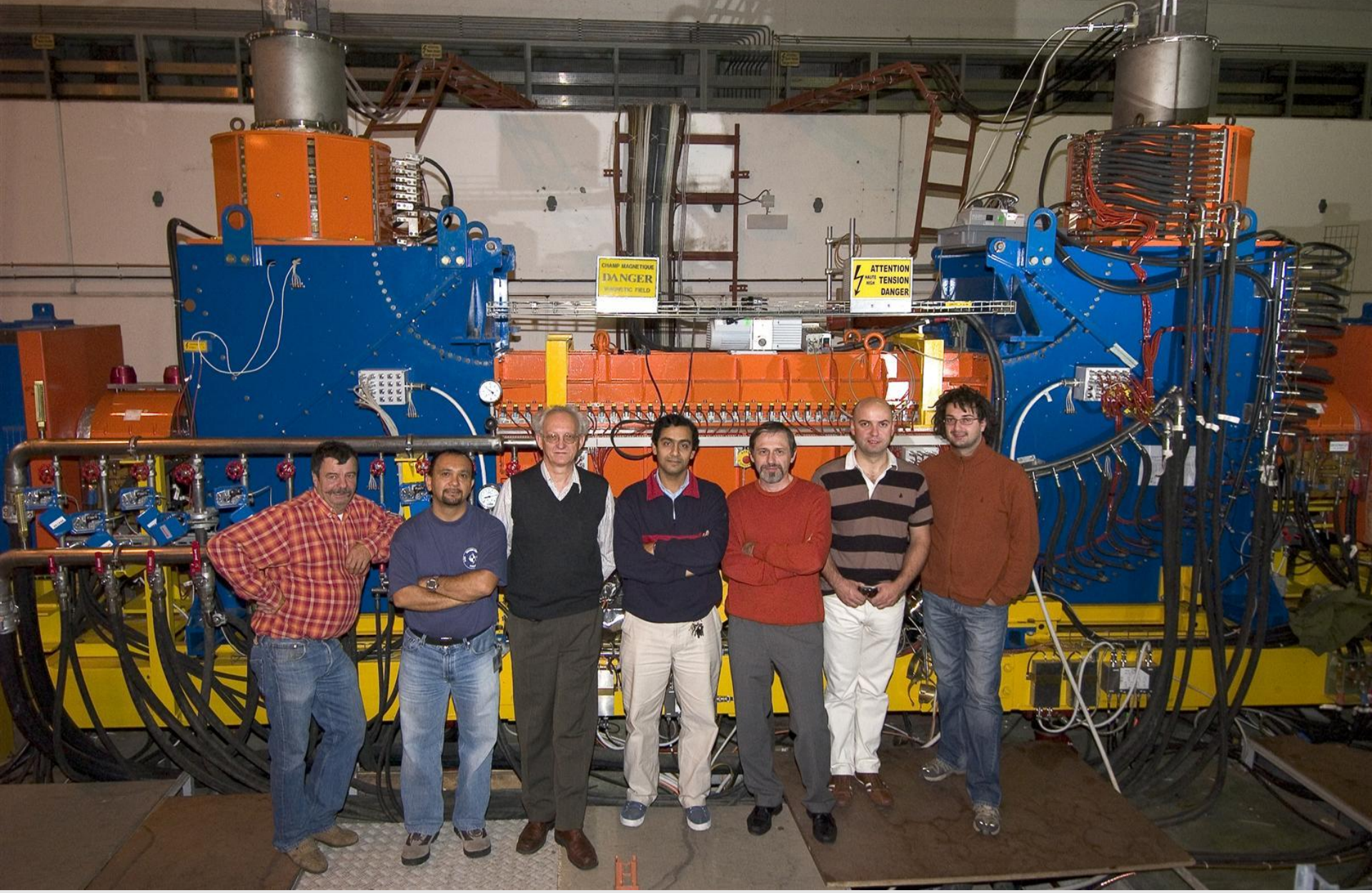

North area
TT 20
SPS
SPS: 26 to 450 GeV
TT 2
West area
TT 60
TT 10
LHC
TT 40
TI 8
TT 41
nTOF
TT 2
AD
PSB: 50 MeV
to 1.4 GeV
CNGS
123
Booster
Isolde
LINAC2
LINAC3
LEIR
East area
PS:1.4 to 26 GeV
to Gran Sasso
CTF3
CERN accelerators
S. De Man 16/05/2003 - proportions not to scale


CERN accelerators
North area
TT 20
West area
TT 2
TT 60
TT 10
nTOF
TT 2
AD
123
SPS
SPS: 26 to 450 GeV
LHC
TT 40
TI 8
TT 41
CNGS
PSB: 50 MeV
to 1.4 GeV
Booster
Isolde
LINAC2
LINAC3
LEIR
East area
PS:1.4 to 26 GeV
to Gran Sasso
CTF3
S. De Man 16/05/2003 - proportions not to scale

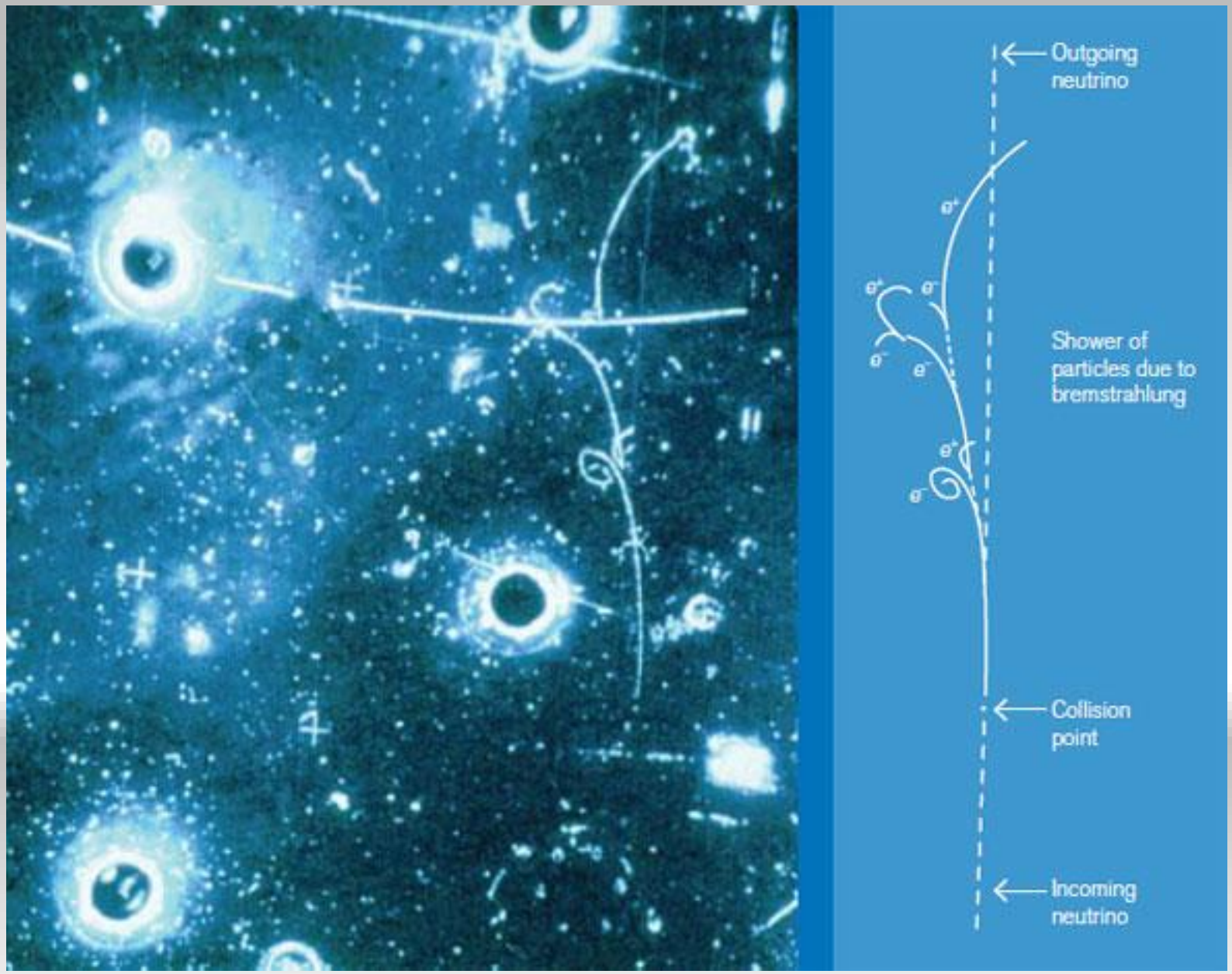

North area
TT 20
TT 2
West area
TT 60
TT 10
nTOF
TT 2
AD
123
SPS
SPS: 26 to 450 GeV
LHC
TT 40
TT 41
CNGS
PSB: 50 MeV
to 1.4 GeV
Booster
Isolde
LINAC2
LINAC3
LEIR
East area
PS:1.4 to 26 GeV
to Gran Sasso
CTF3
CERN accelerators
S. De Man 16/05/2003 - proportions not to scale



Professor Tommy Eriksson in the AD with some of the tools of the trade



In front of LEIR's electron cooling system, from left to right, Christian Lacroix, Django Manglunki, Michel Chanel, Gérard Tranquille, Pavel Belochitskii, Joao Carlos Oliveira and Emanuele Matli.



1973: discovery of weak neutral currents at Gargamelle/PS

STOCHASTIC DAMPING OF BETATRON OSCILLATIONS

IN THE ISR

by

S. van der Meer

Internal report CERN ISR-PO 72/31, 1972.
Kindly scanned by the Japanese

Geneva - August, 1972

SUMMARY

In principle, betatron oscillations could be damped by detecting and compensating statistical variations of the average beam position, caused by the finite number of particles present. It is shown that achieving useful damping in the ISR would be difficult with presently available techniques.

4. FINAL NOTE

This work was done in 1968. The idea seemed too far-fetched at the time to justify publication. However, the fluctuations upon which the system is based were experimentally observed recently. Although it may still be unlikely that useful damping could be achieved in practice, it seems useful now to present at least some quantitative estimation of the effect.

ISR-PO/68-31
June 18th, 1968

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

CALIBRATION OF THE EFFECTIVE BEAM HEIGHT IN THE ISR

by

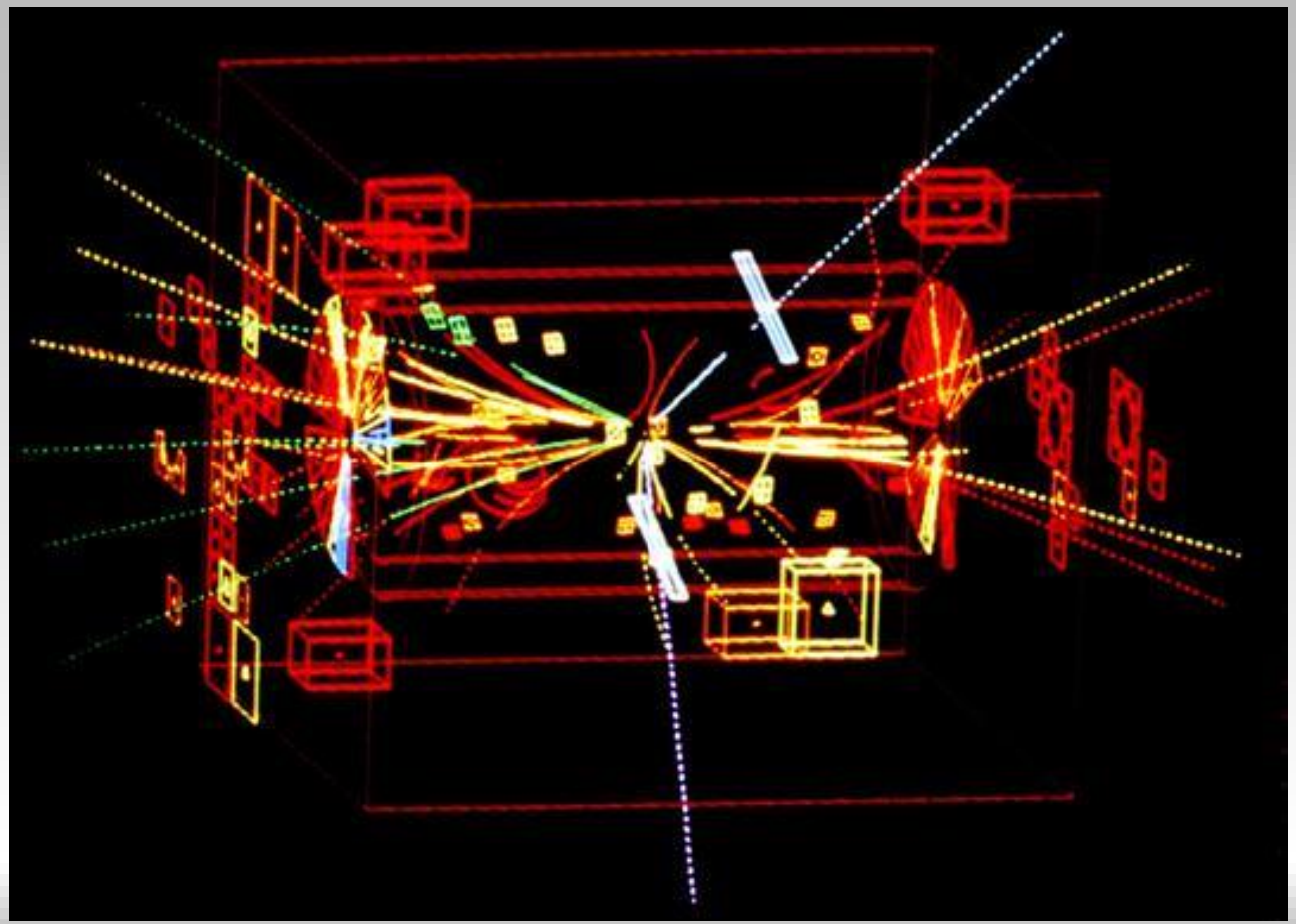
S. van der Meer

AT THIS TIME, MY WORK ON THE SPS POWER SUPPLIES HAD JUST COME TO AN END. I JOINED A STUDY GROUP ON THE PP PROJECT AND AN EXPERIMENTAL TEAM STUDYING COOLING IN A SMALL RING (ICE).

"F**KING GENIUS"
Former co-worker
8th June 2013

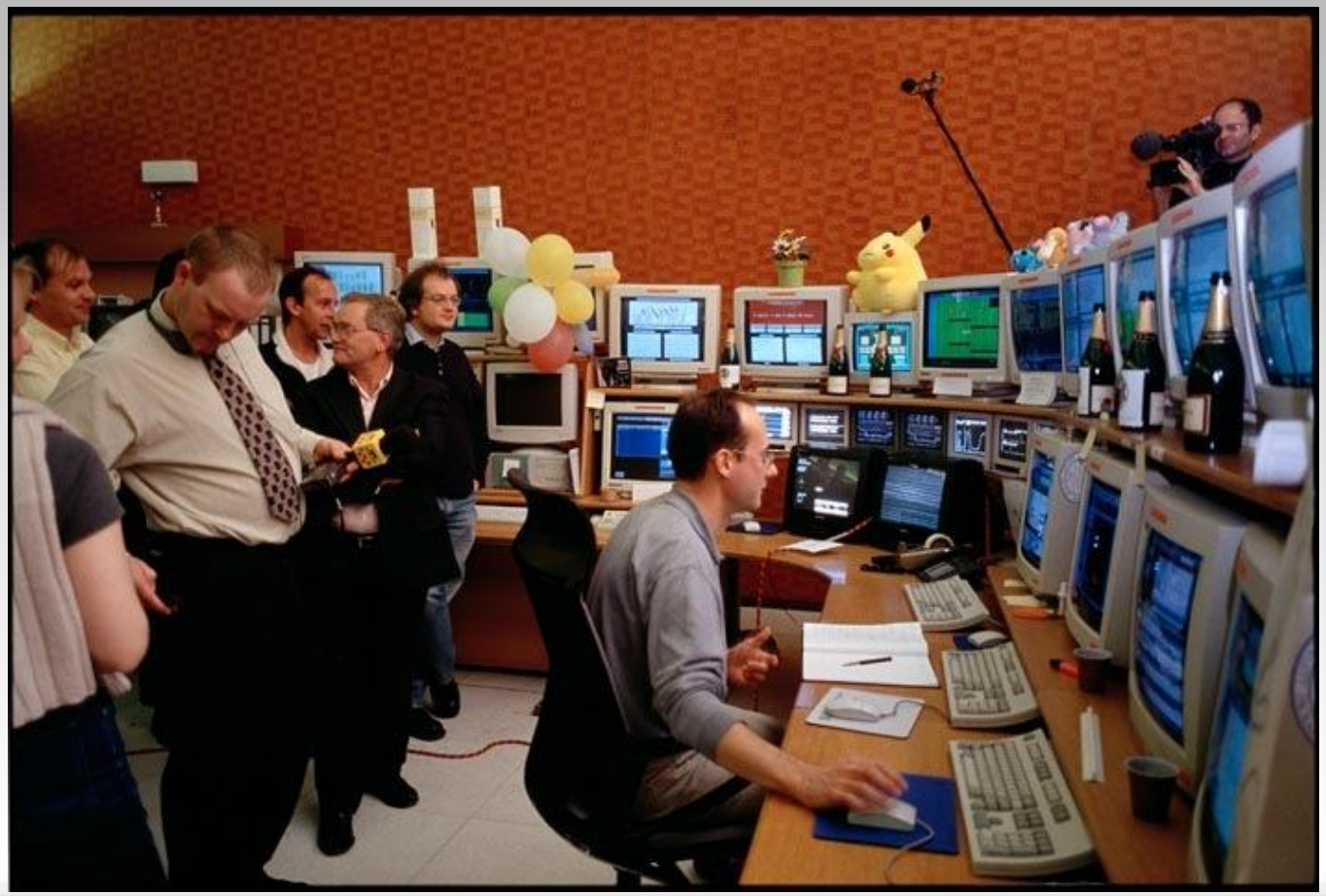
SIMON VAN DER MEER

On 3 July 1980, beam circulated for the first time in the Antiproton Accumulator (AA).



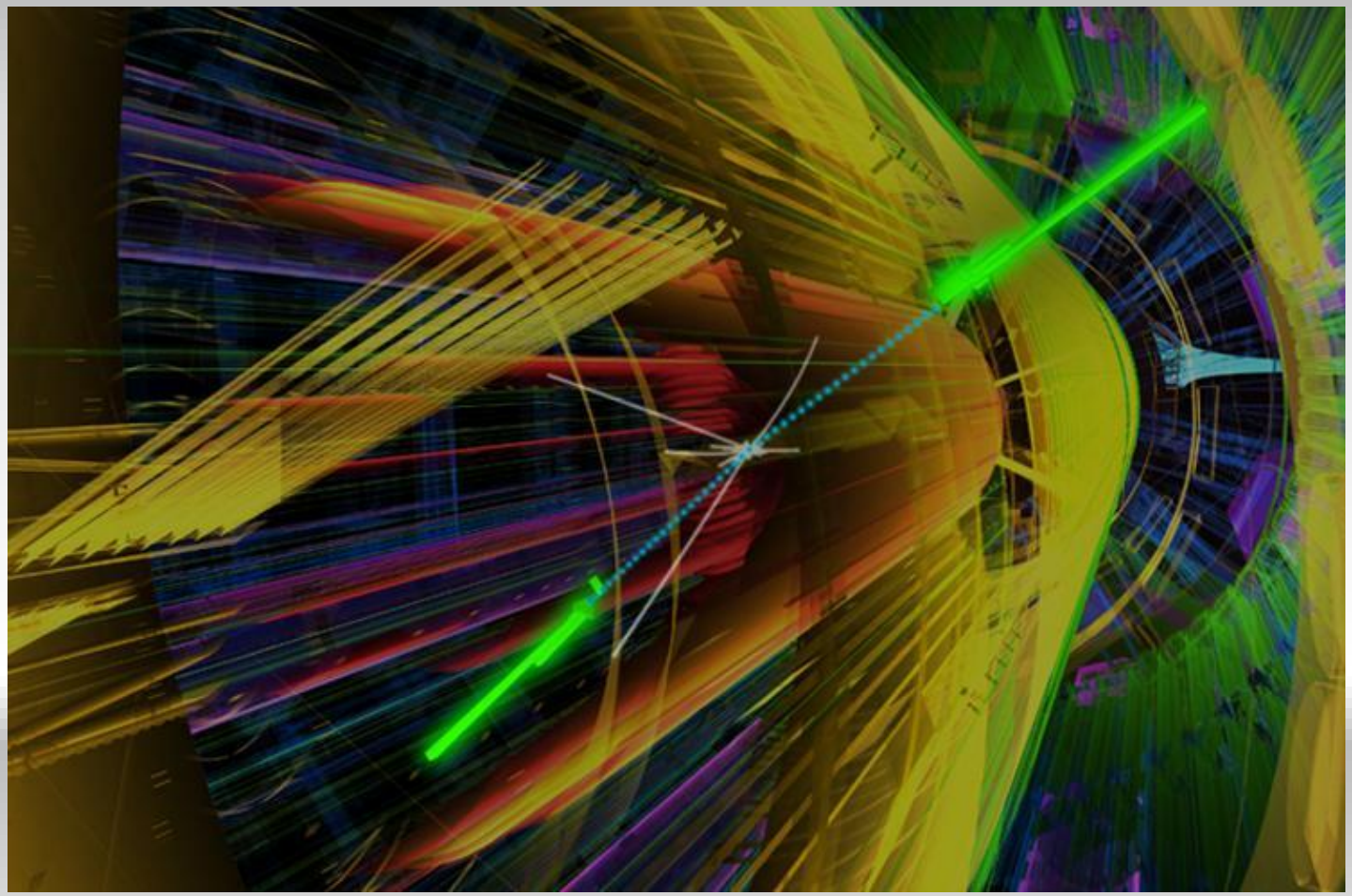
1983: discovery of W^+,W^- and Z^0 at the SPS

And again with p-pbar, the discovery of the top quark in 1995 at the Tevatron and latterly Higgs exclusion etc.



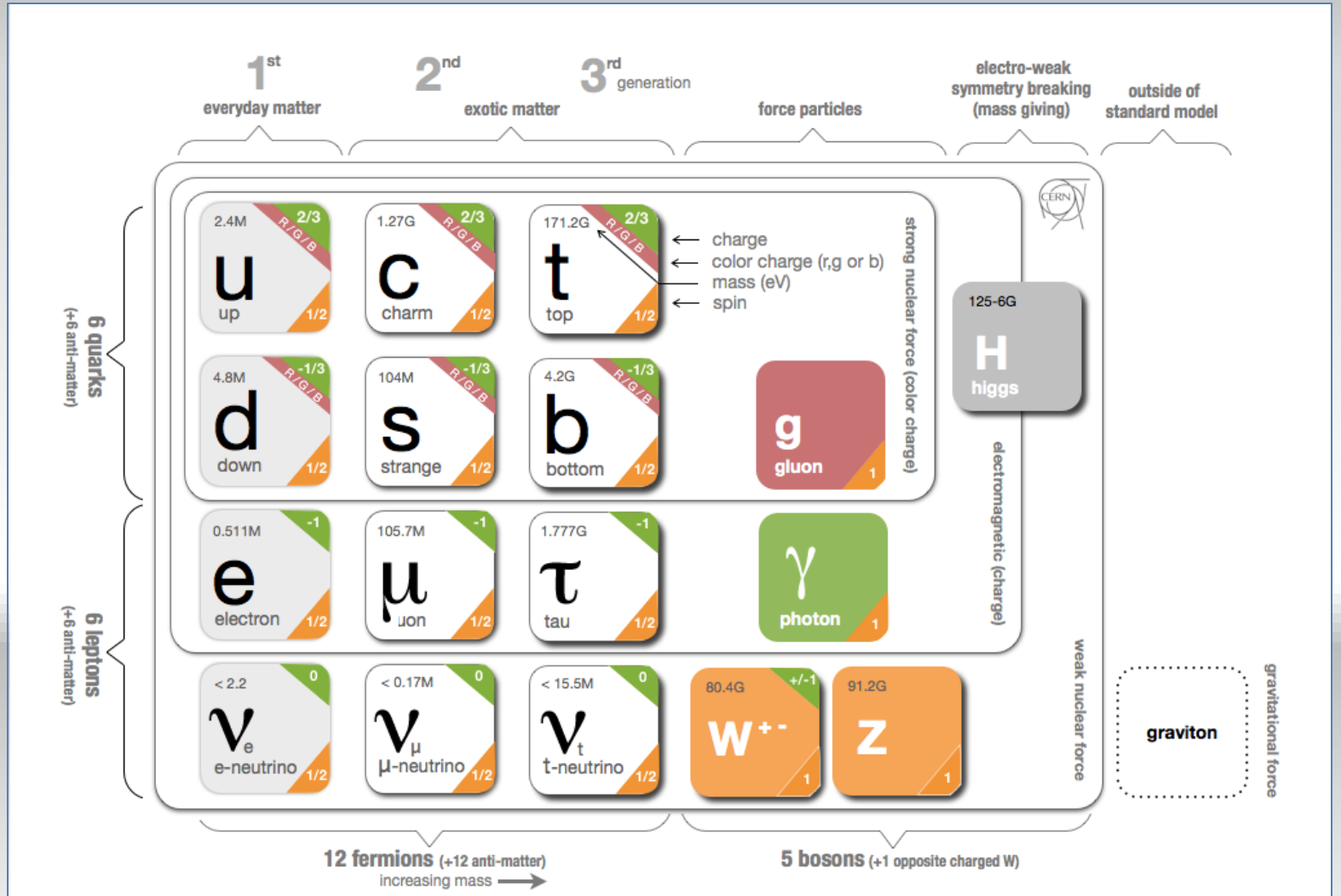
LEP: 18 million Zs 80,000 Ws

Enjoyed the profound benefits of radiation cooling, particular at LEP II above 80 GeV: very high beam-beam tune shifts, able jump 1/3 order resonance, ramp the energy in physics…



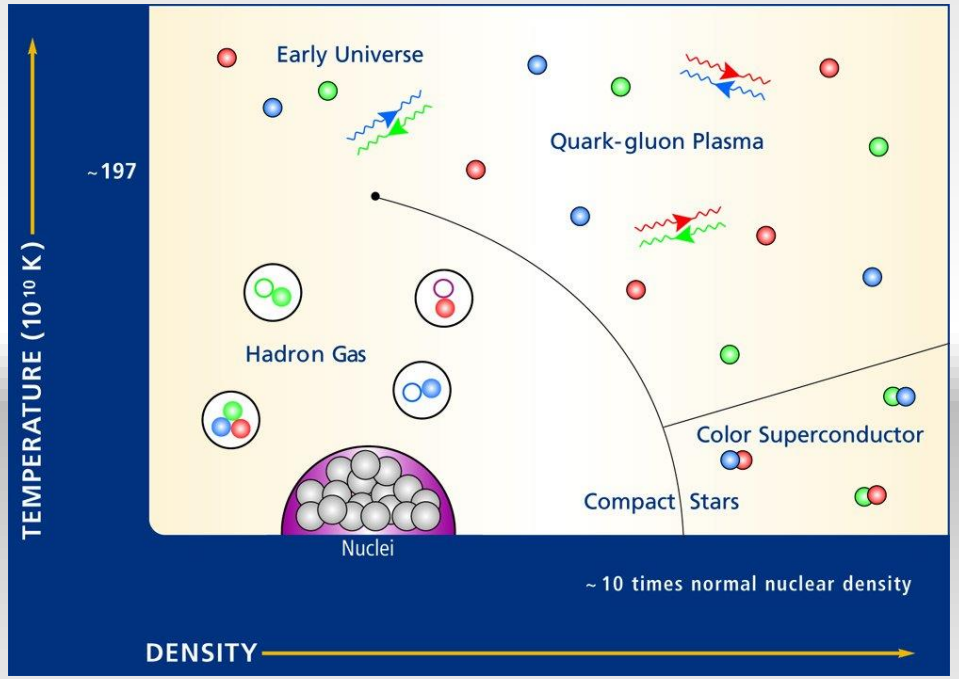
July 4th 2012: discovery of Higgs at the LHC

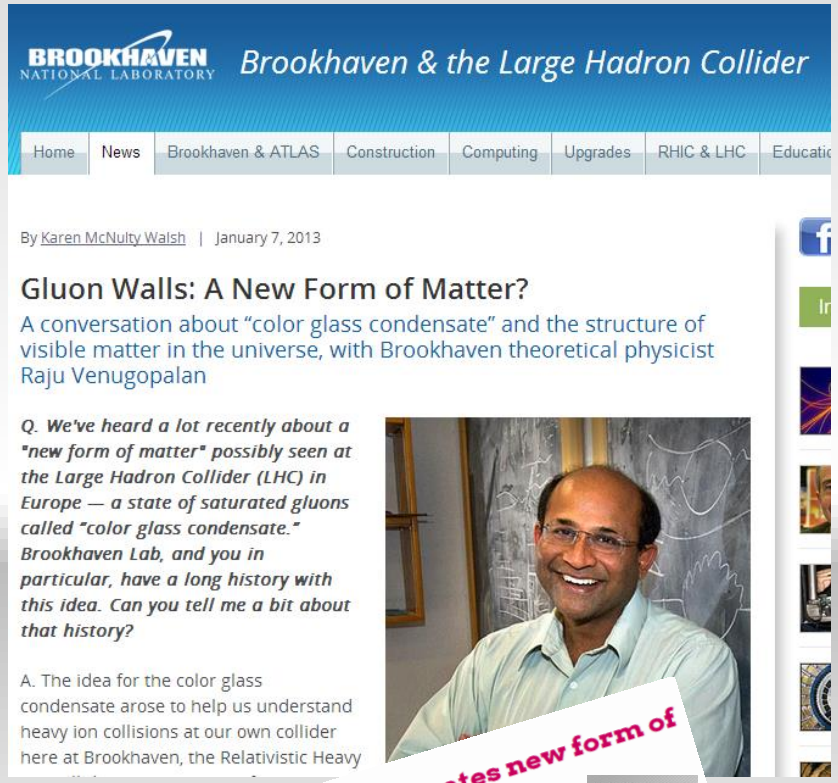
The standard model

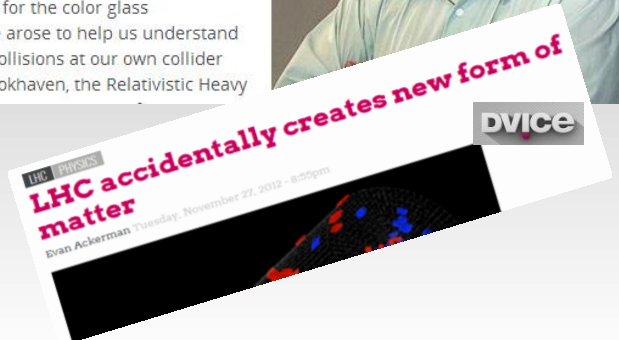


Ions to SHINE and LHC 2011/2012

Both the lead-lead and the proton-lead a big success, in large part thanks to intensity and emittance delivered by the injectors







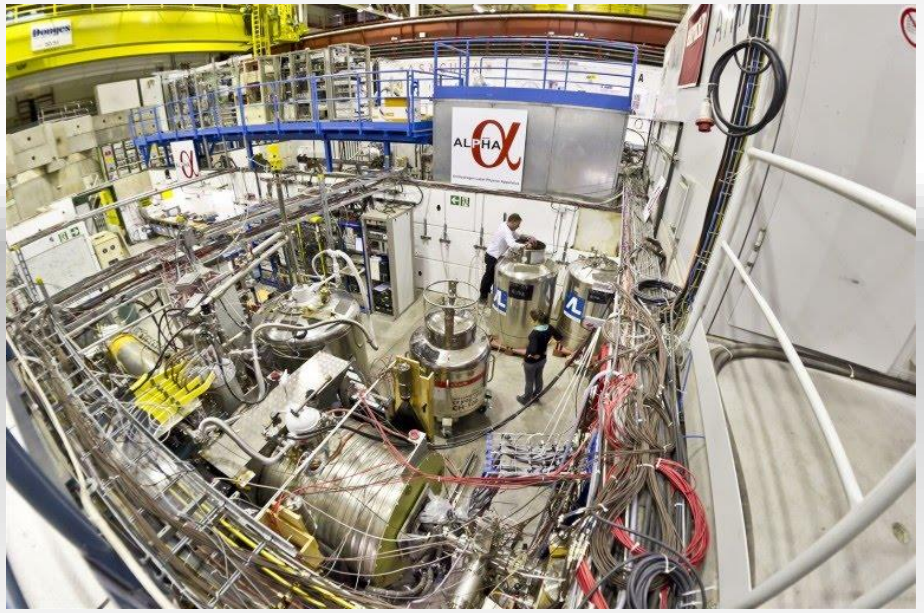
Trapped antihydrogen

G. B. Andresen, M. D. Ashkezari, M. Baquero-Ruiz, W. Bertsche, P. D. Bowe, E. Butler, C. L. Cesar, S. Chapman, M. Charlton, A. Deller, S. Eriksson, J. Fajans, T. Friesen, M. C. Fujiwara, D. R. Gill, A. Gutierrez, J. S. Hangst, W. N. Hardy, M. E. Hayden, A. J. Humphries, R. Hydomako, M. J. Jenkins, S. Jonsell, L. V. Jørgensen, L. Kurchaninov + *et al.*

Affiliations | Contributions | Corresponding author

Nature **468**, 673–676 (02 December 2010) | doi:10.1038/nature09610

Received 08 October 2010 | Accepted 27 October 2010 | Published online 17 November 2010



Physics World reveals its top 10 breakthroughs for 2010

1st place: Antihydrogen success

10th place: CERN achieves landmark collisions

Much Cooler than LHC

Is the AD cooler than the LHC?

- Temperature of 8 TeV proton-proton collision
  - 4.6×10^{16} K (around 4.4×10^{-14} s after the big bang)
- However the LHC does have around 90 tonnes of superfluid Helium at 1.9 K
- And a geometric emittance of 0.6 nm at 4 TeV
- But the depth of ALPHA's antihydrogen trap is 0.6 K

In fact this is rather academic

Operations group meeting 2012

- Bertrand*: The AD is cooler than the LHC
- Me (suspiciously): Is that true?
- Bertrand: I just mean we're cooler than the LHC guys

* Bertrand Lefort


I rest my case

Many thanks to the local organizing committee and international program committee

Have a fabulous week!