

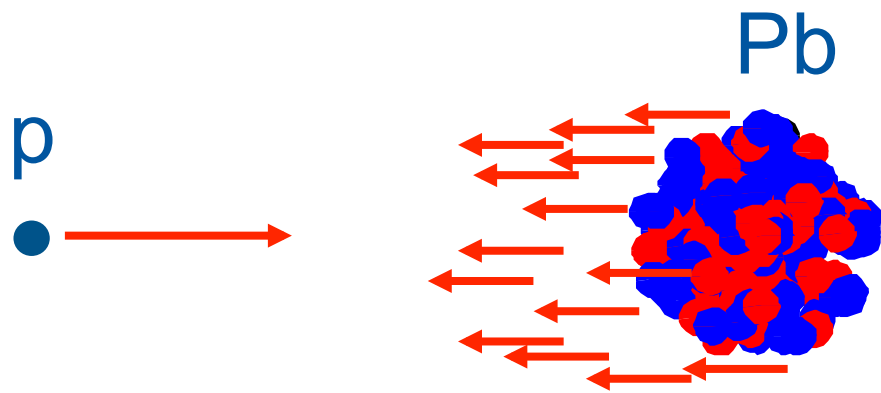


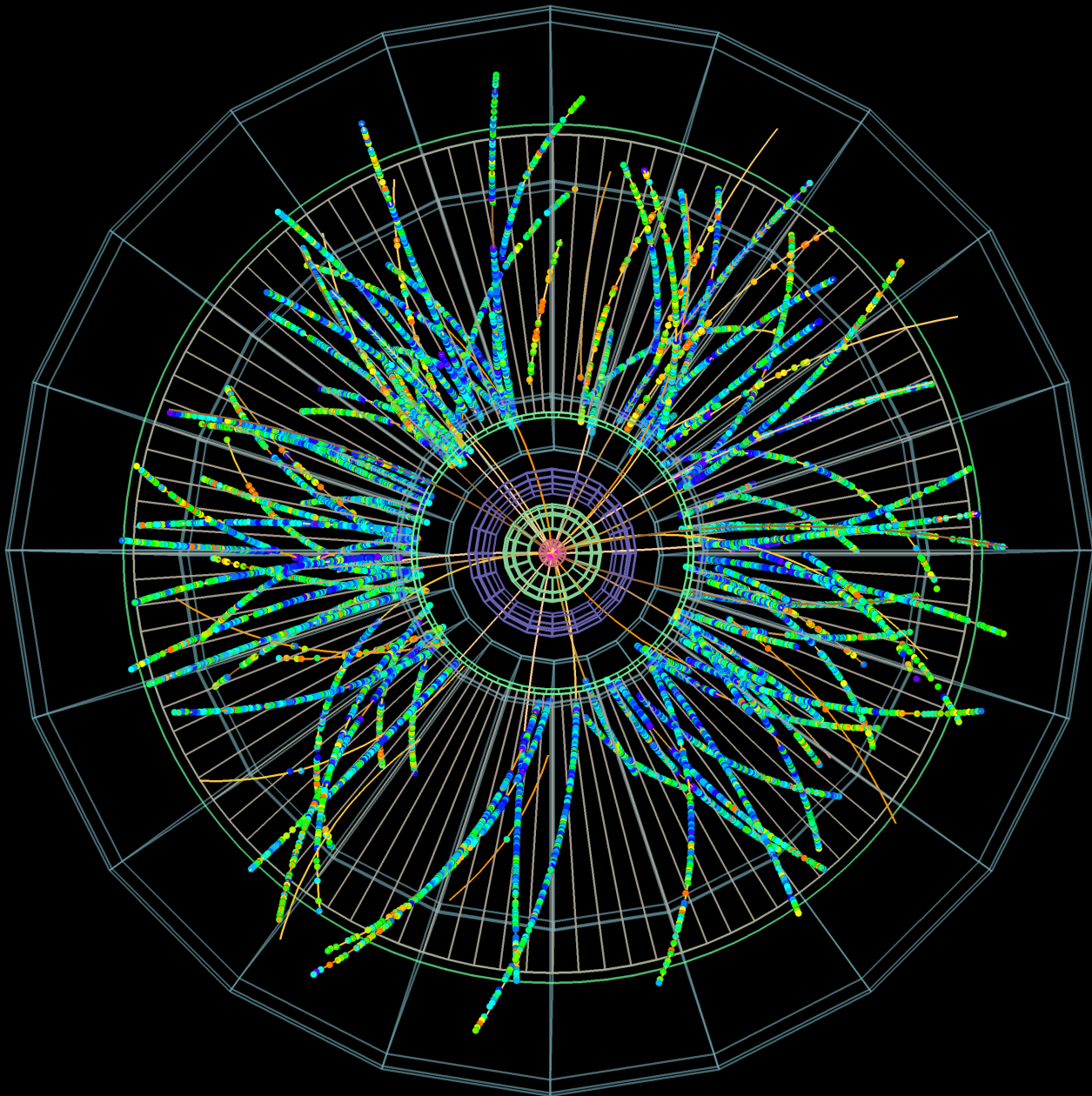
#askCERN

Hangout with CERN: Mouse and Mammoth Questions

31 January 2013







Pb →

jet $p_T = 49.7$ GeV
 $\eta = -1.9, |\Delta\phi_{\gamma J}| = 2.8$

jet $p_T = 60.3$ GeV
 $\eta = -0.2, |\Delta\phi_{\gamma J}| = 3.12$

← **p**

photon $p_T = 107$ GeV, $\eta = -0.55$

$p+\text{Pb } \sqrt{s_{NN}} = 5.02$ TeV

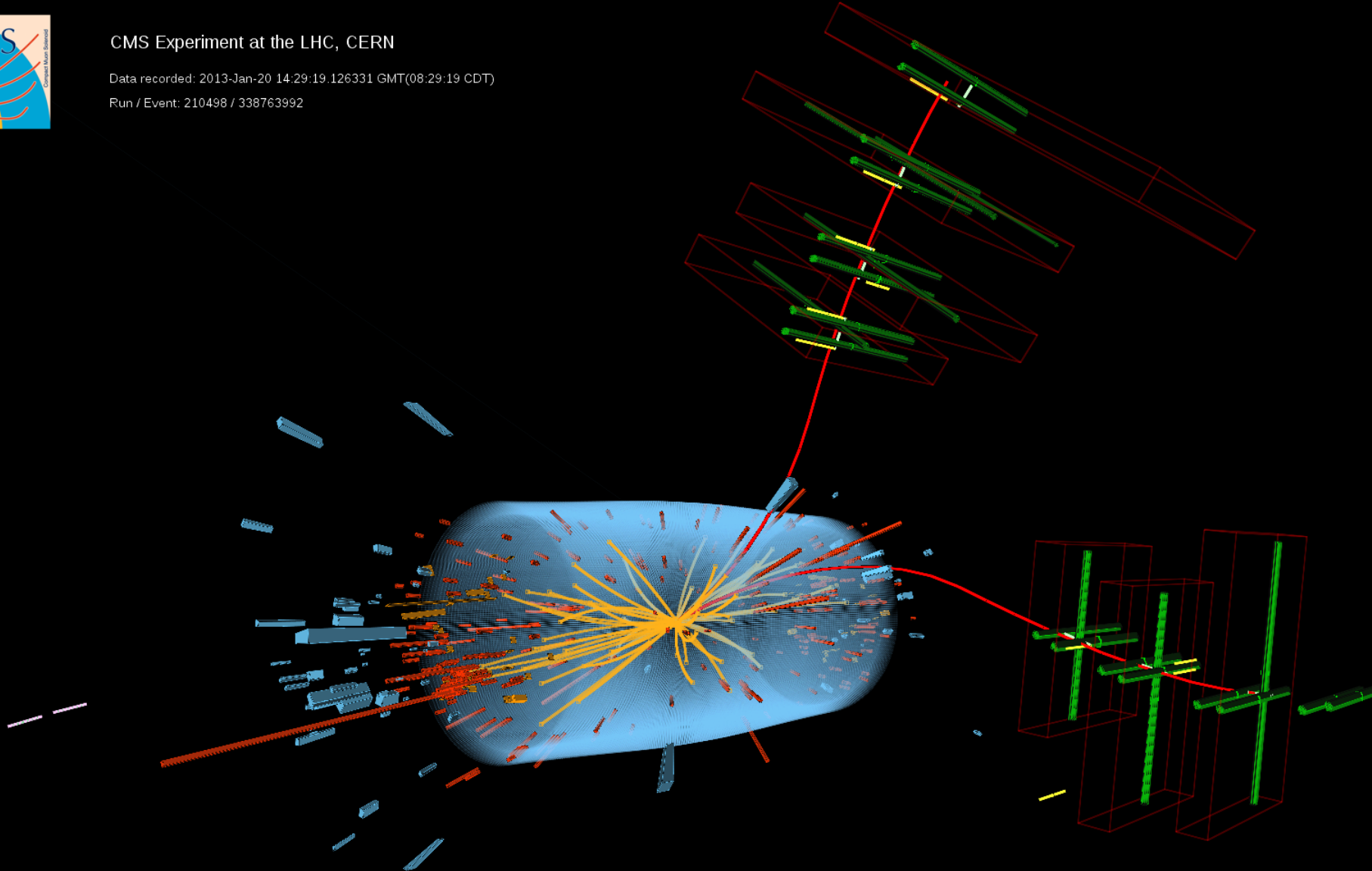
Run: 217999
Event: 145910472
Date: 22 Jan 2013



CMS Experiment at the LHC, CERN

Data recorded: 2013-Jan-20 14:29:19.126331 GMT(08:29:19 CDT)

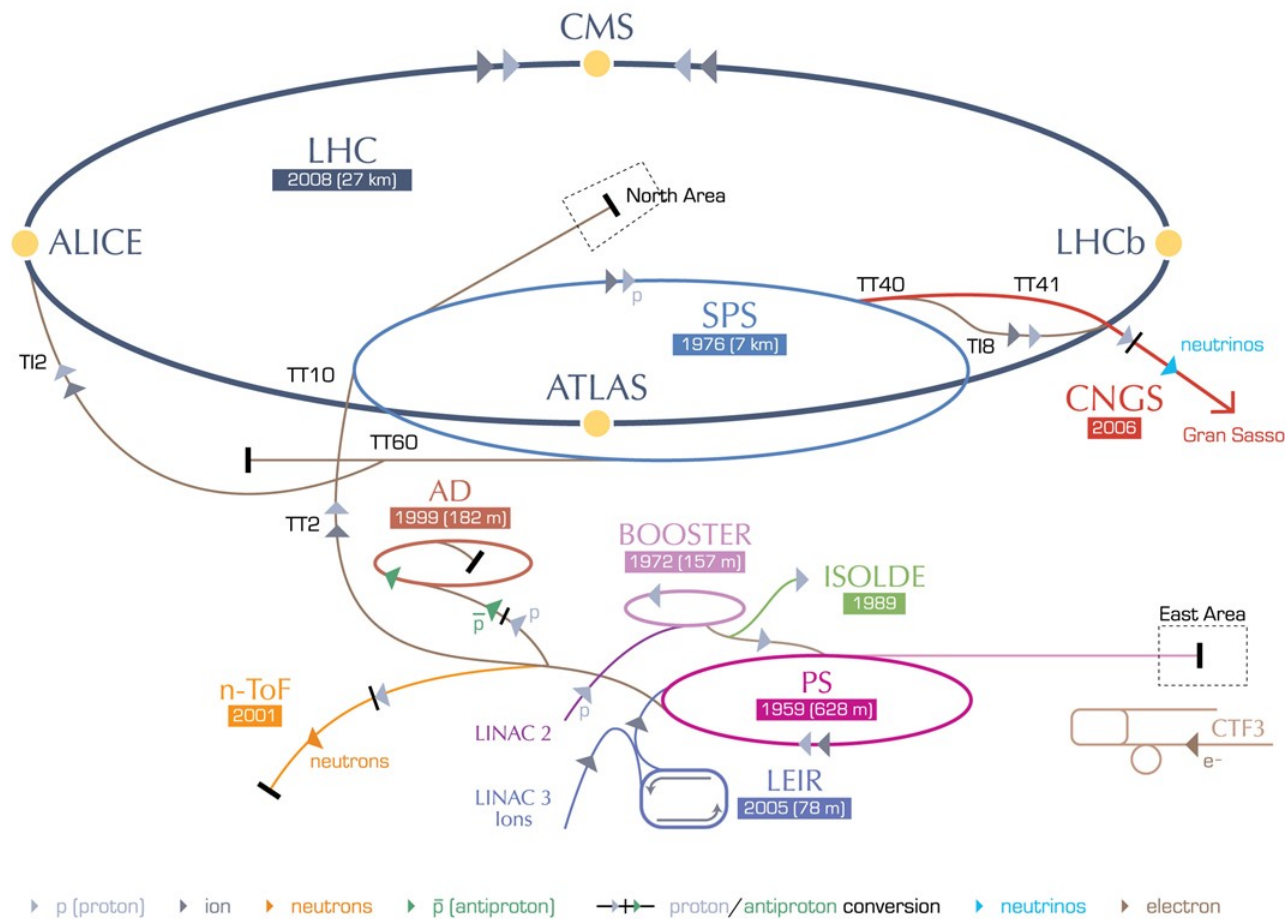
Run / Event: 210498 / 338763992



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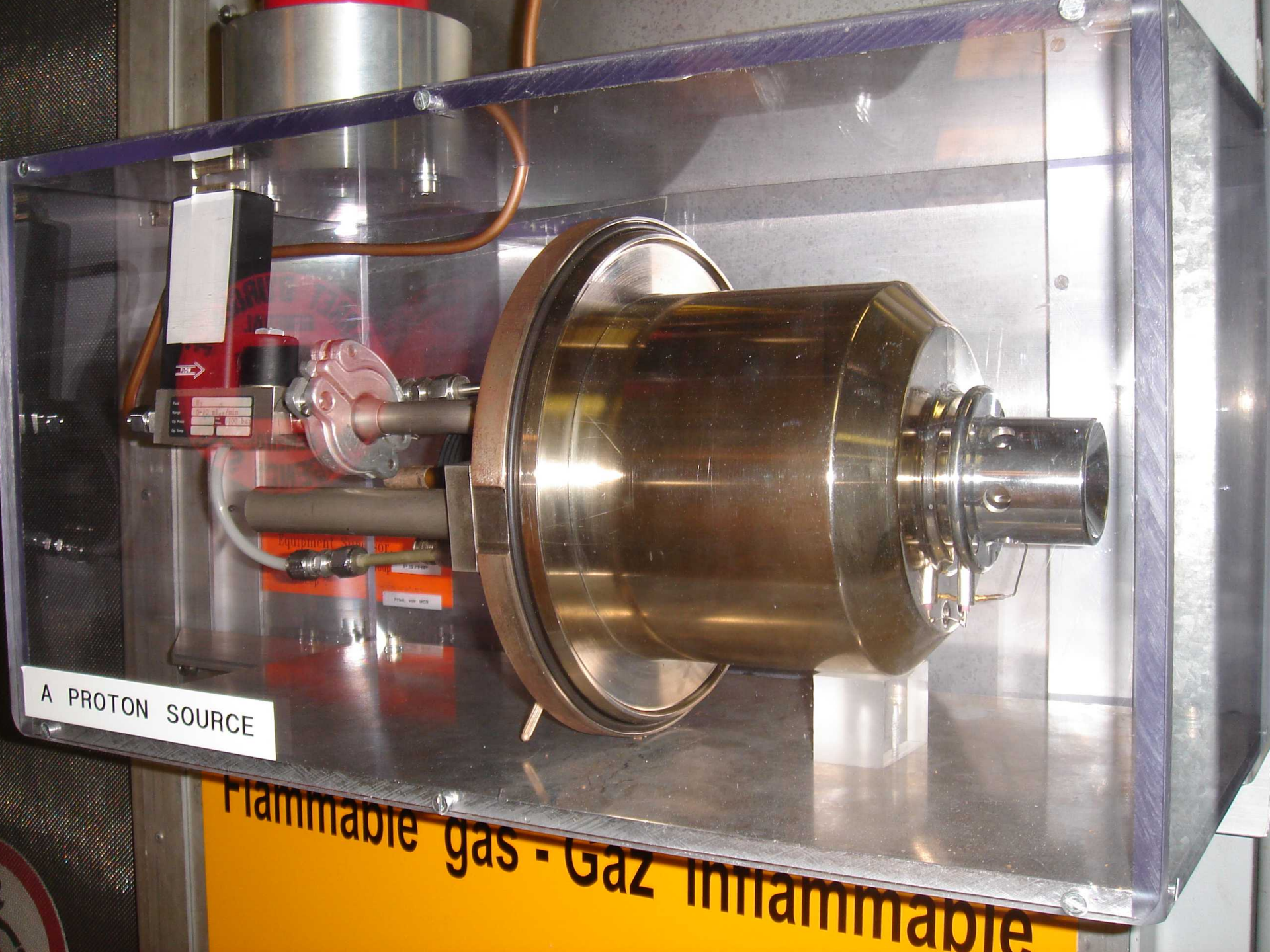


CERN's accelerator complex



LHC Large Hadron Collider SPS Super Proton Synchrotron PS Proton Synchrotron

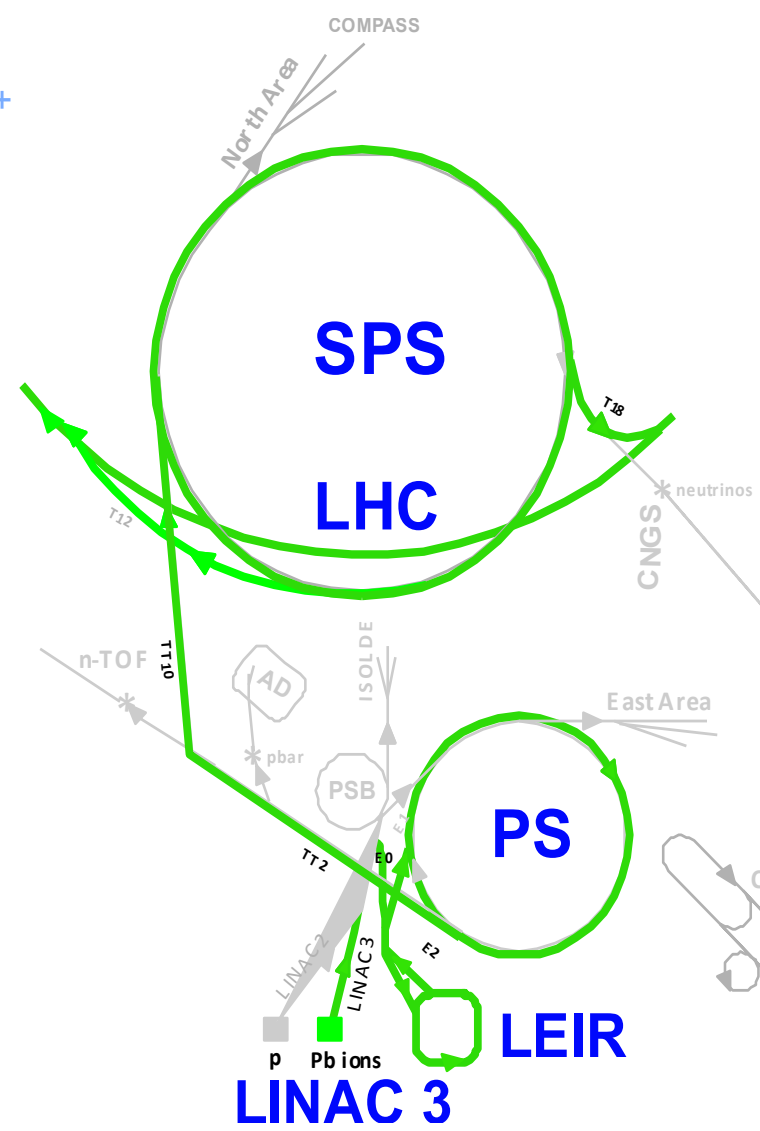
AD Antiproton Decelerator CTF3 Clic Test Facility CNGS Cern Neutrinos to Gran Sasso ISOLDE Isotope Separator OnLine DEvice
 LEIR Low Energy Ion Ring LINAC LINEar ACcelerator n-ToF Neutrons Time Of Flight



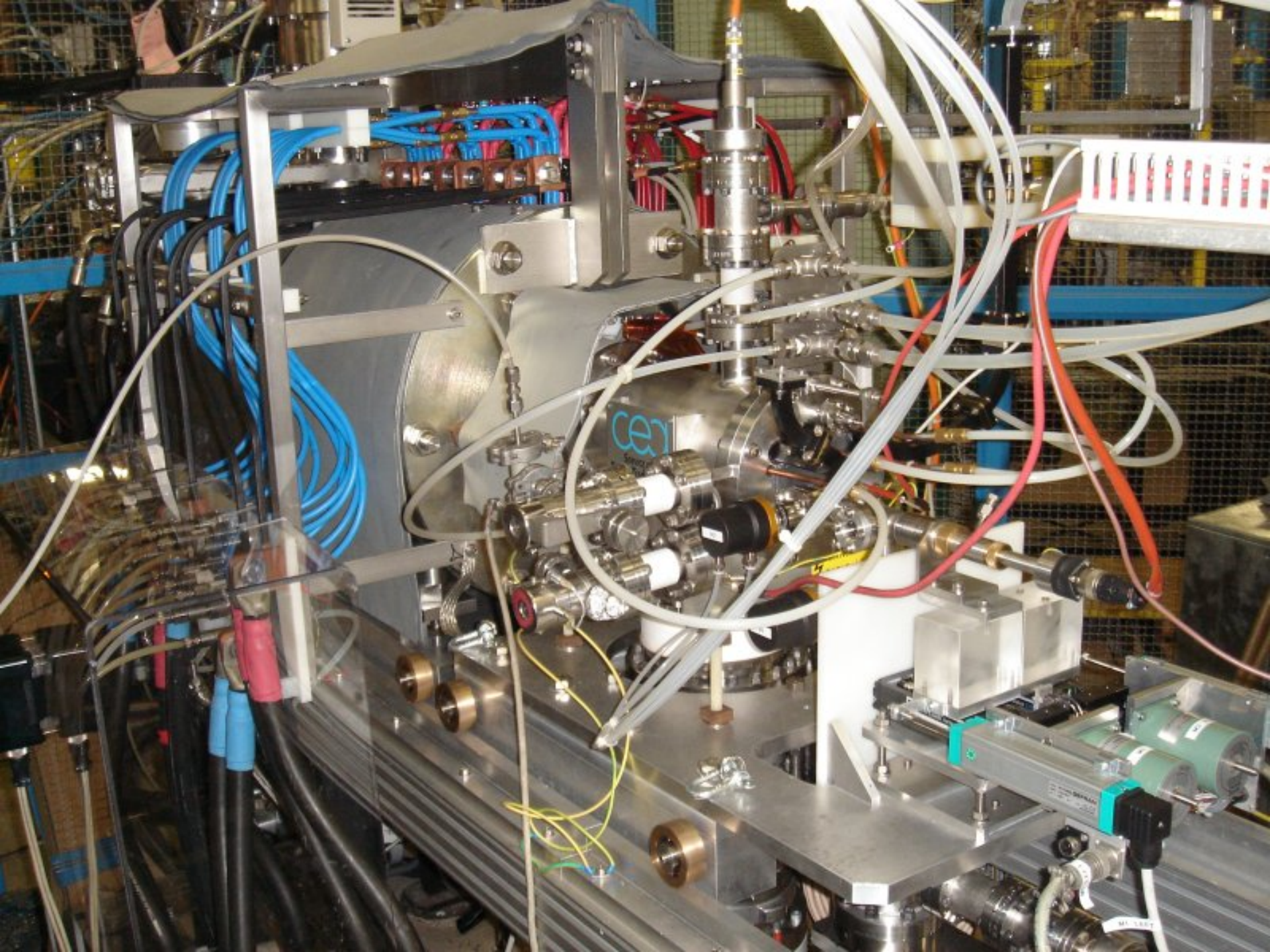
A PROTON SOURCE

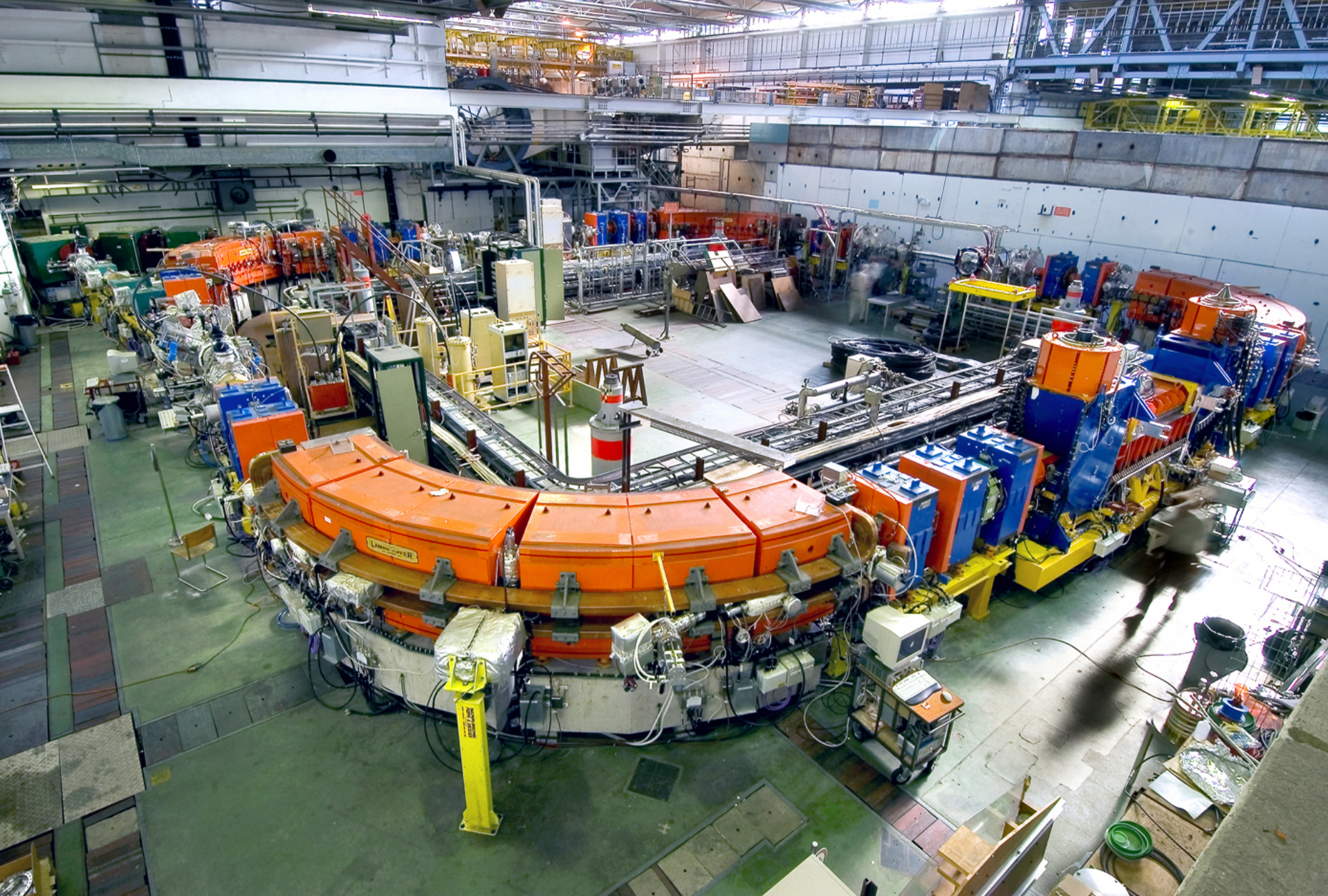
Flammable gas - Gaz inflammable

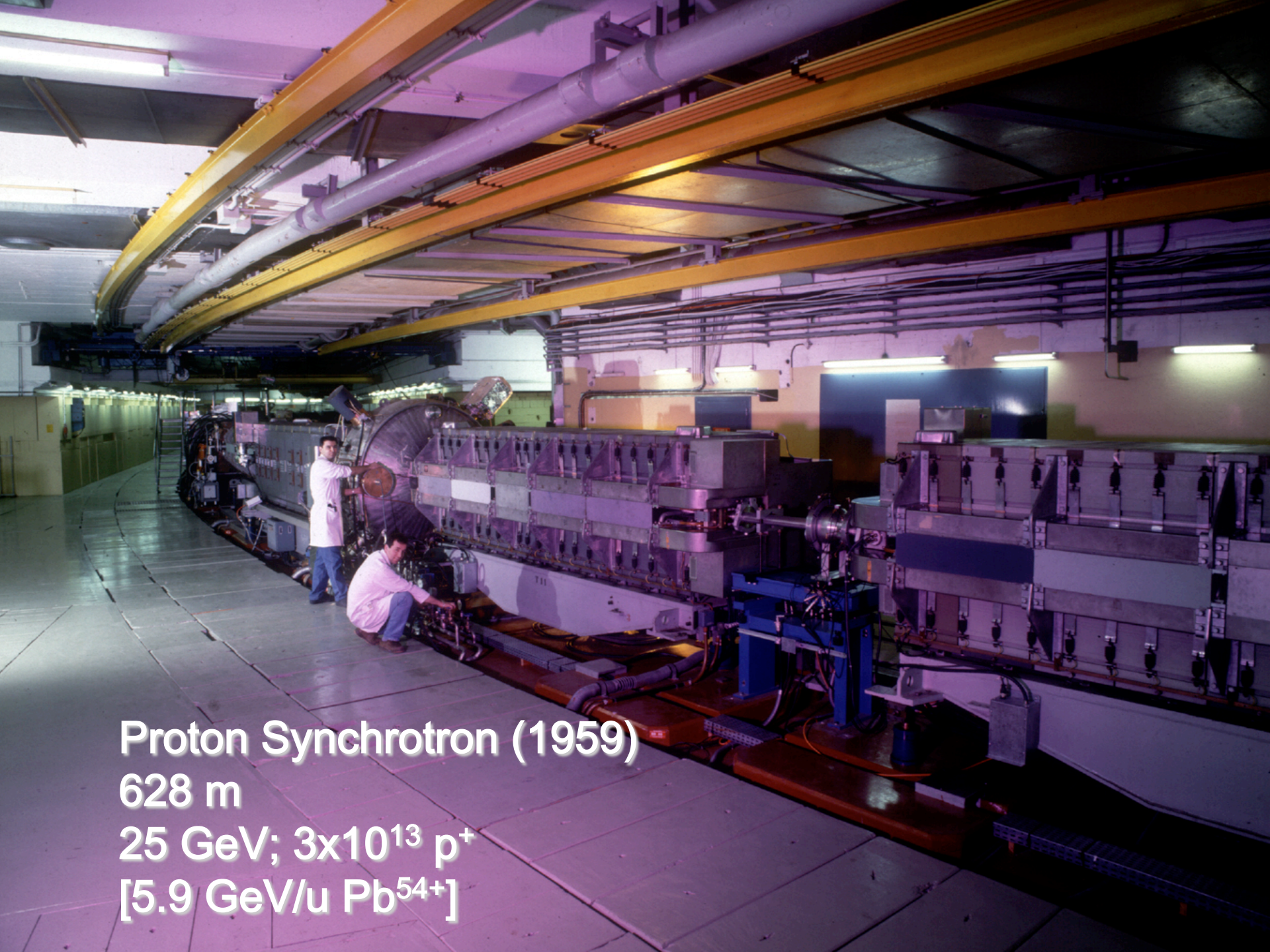
- ECR ion source
 - Provide highest possible intensity of Pb^{29+}
- RFQ + Linac 3
 - Adapt to LEIR injection energy
 - strip to Pb^{54+}
- LEIR
 - Accumulate and cool Linac 3 beam
 - Prepare bunch structure for PS
- PS
 - Define LHC bunch structure
 - Strip to Pb^{82+}
- SPS
 - Define filling scheme



The LHC injector chain







Proton Synchrotron (1959)

628 m

25 GeV; 3×10^{13} p⁺

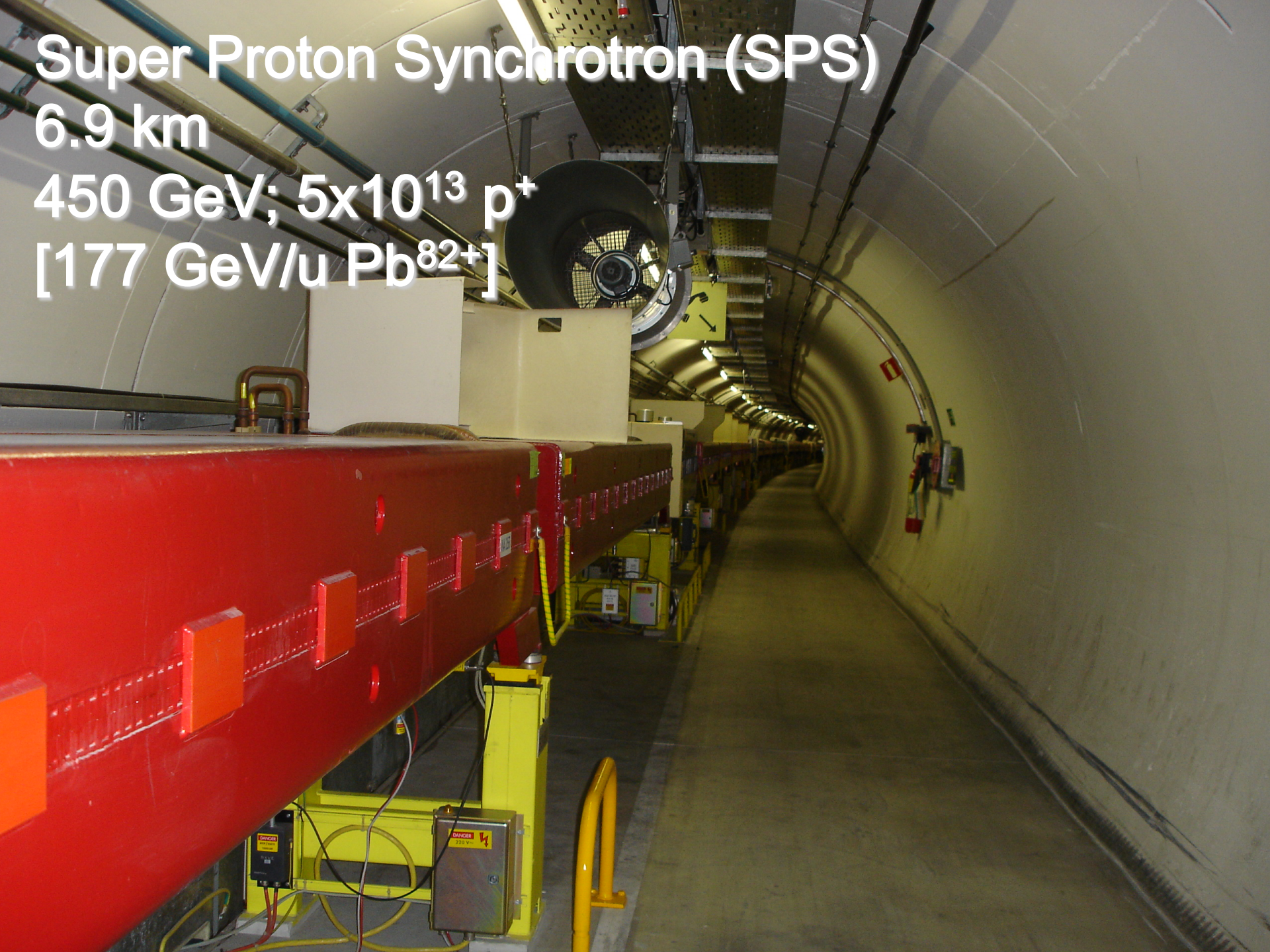
[5.9 GeV/u Pb⁵⁴⁺]

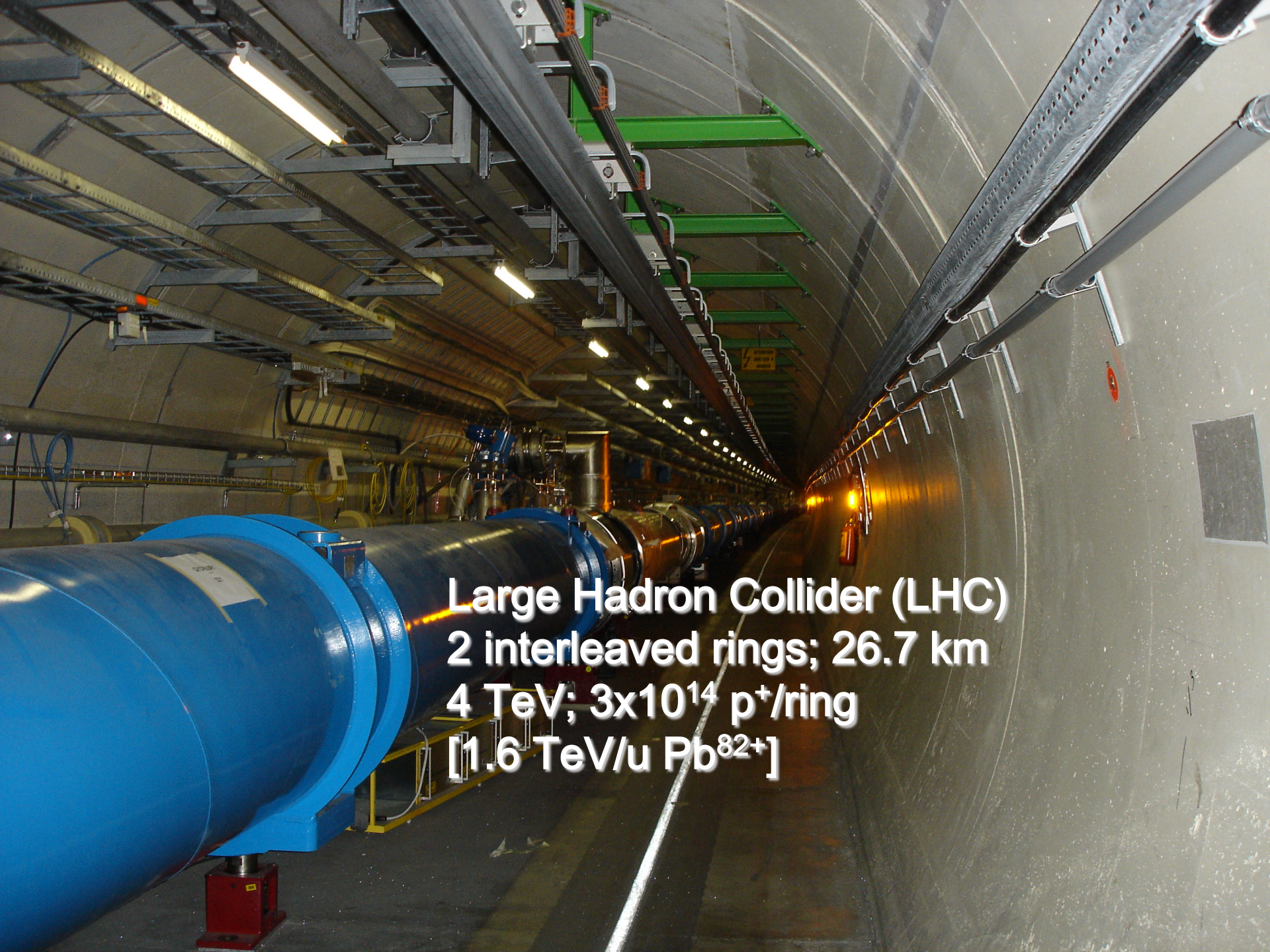
Super Proton Synchrotron (SPS)

6.9 km

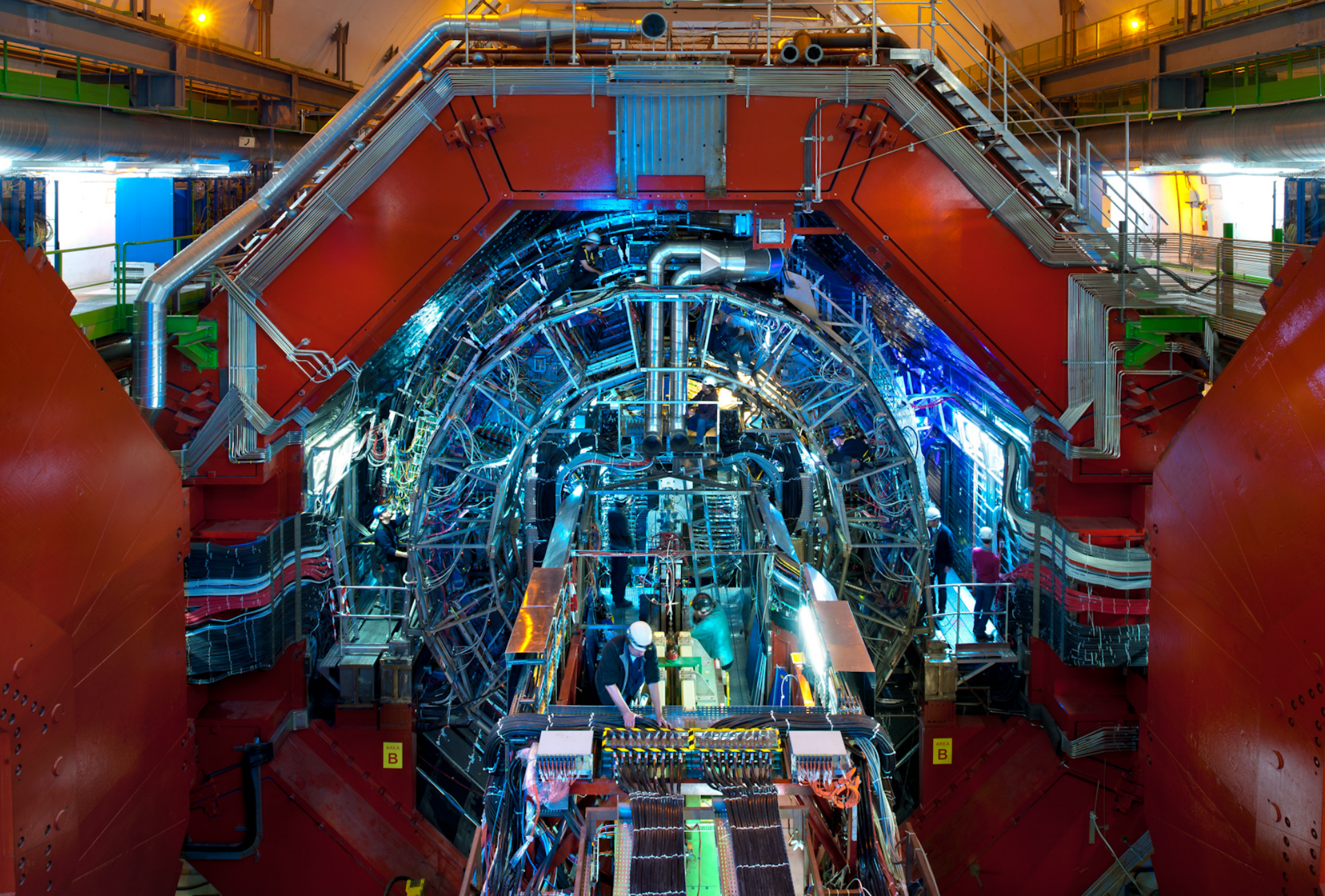
450 GeV; 5×10^{13} p⁺

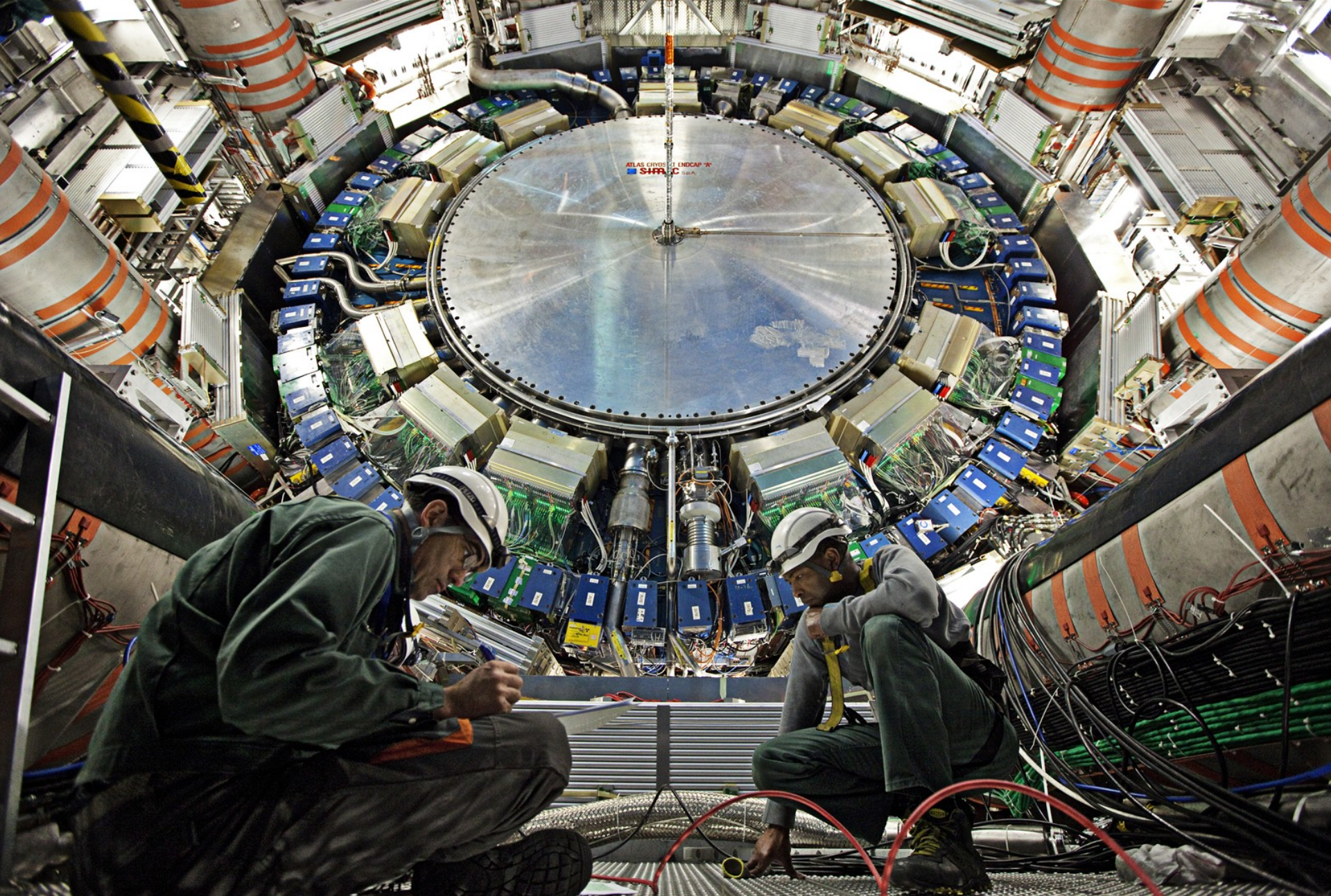
[177 GeV/u Pb⁸²⁺]

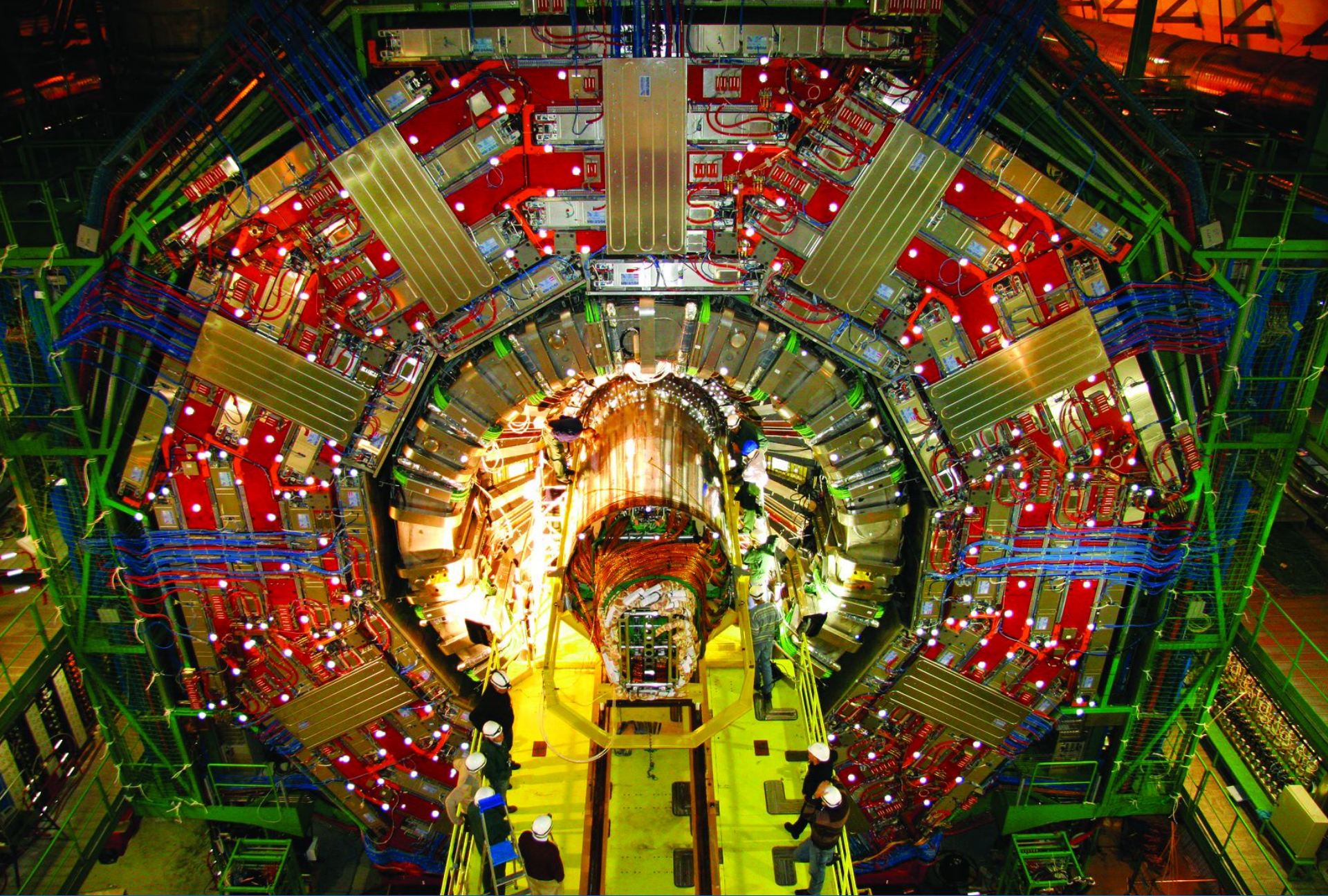


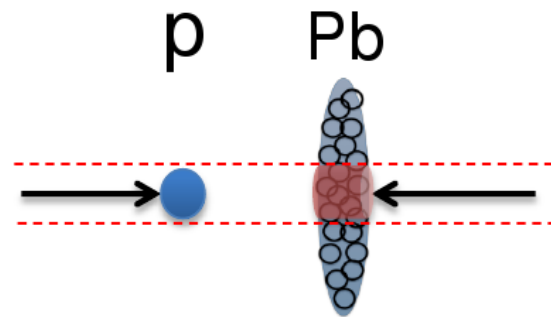
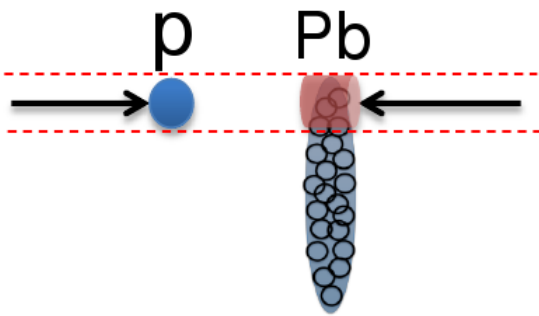


Large Hadron Collider (LHC)
2 interleaved rings; 26.7 km
4 TeV; 3×10^{14} p⁺/ring
[1.6 TeV/u Pb⁸²⁺]







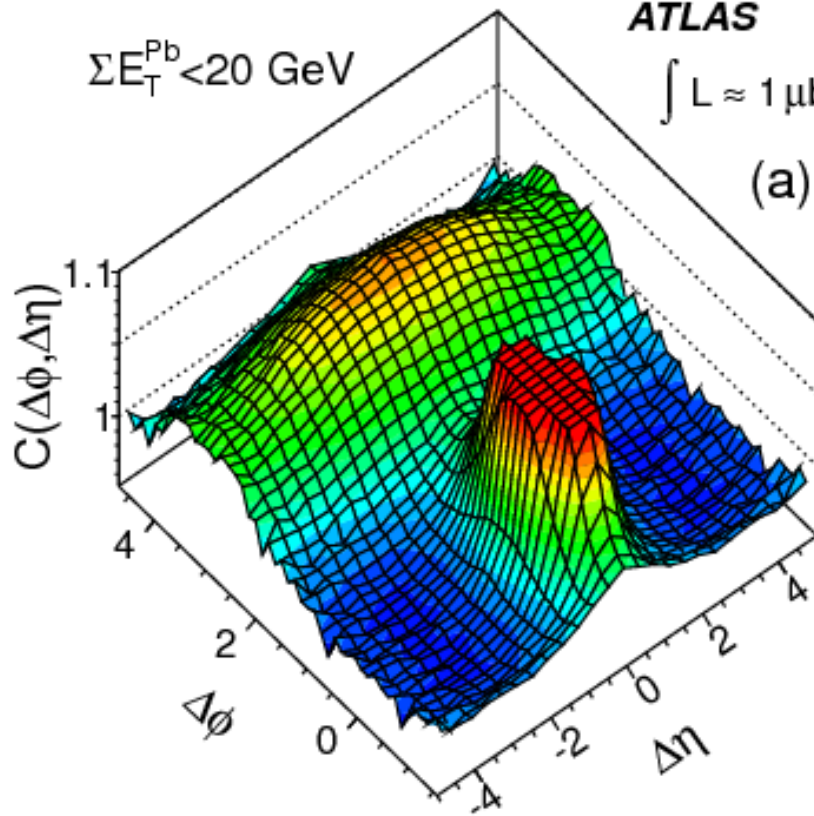


ATLAS p+Pb $\sqrt{s_{NN}}=5.02$ TeV

$$\int L \approx 1 \mu\text{b}^{-1} \quad 0.5 < p_T^{a,b} < 4 \text{ GeV}$$

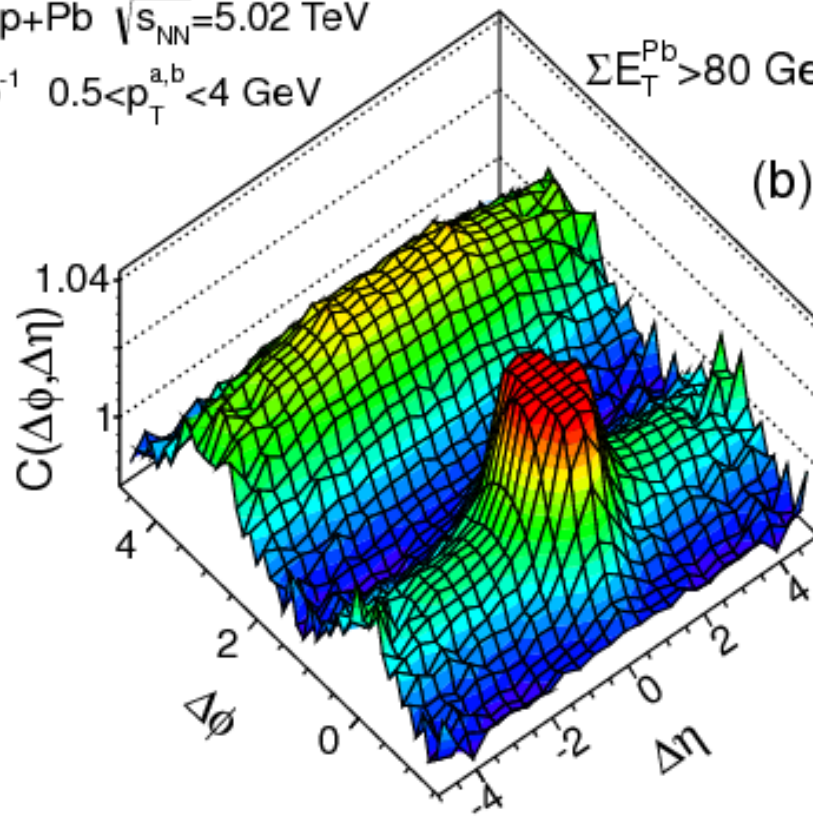
$\Sigma E_T^{\text{Pb}} < 20 \text{ GeV}$

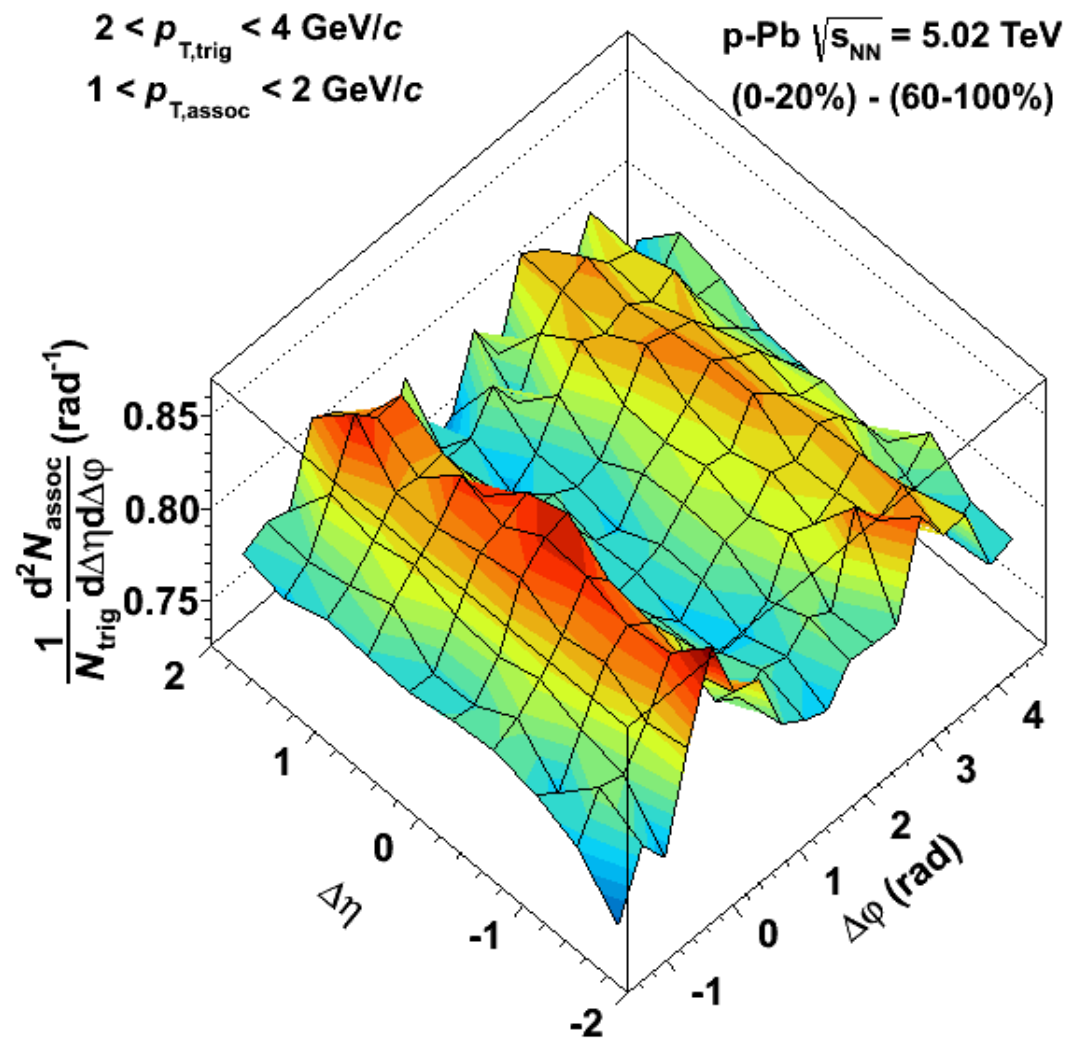
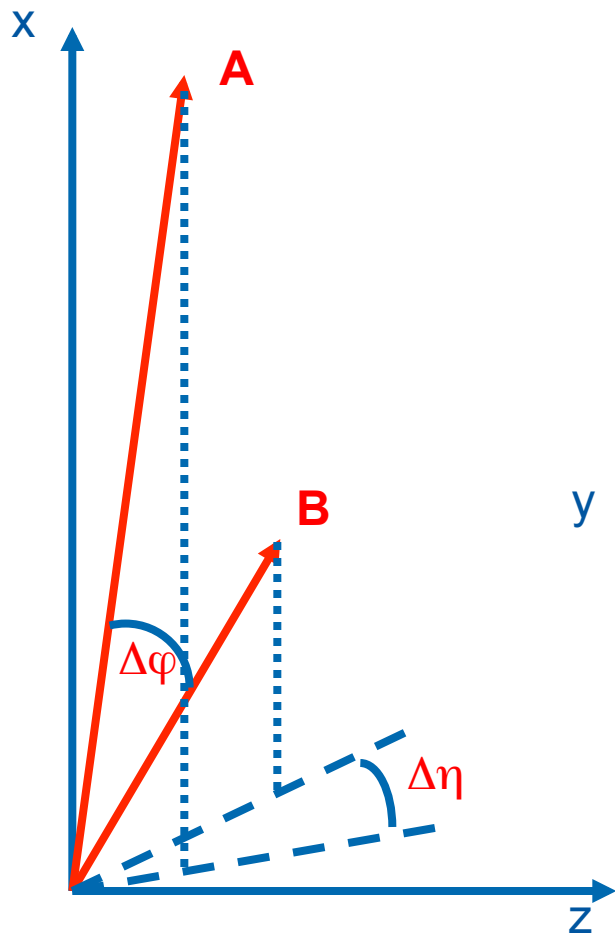
(a)



$\Sigma E_T^{\text{Pb}} > 80 \text{ GeV}$

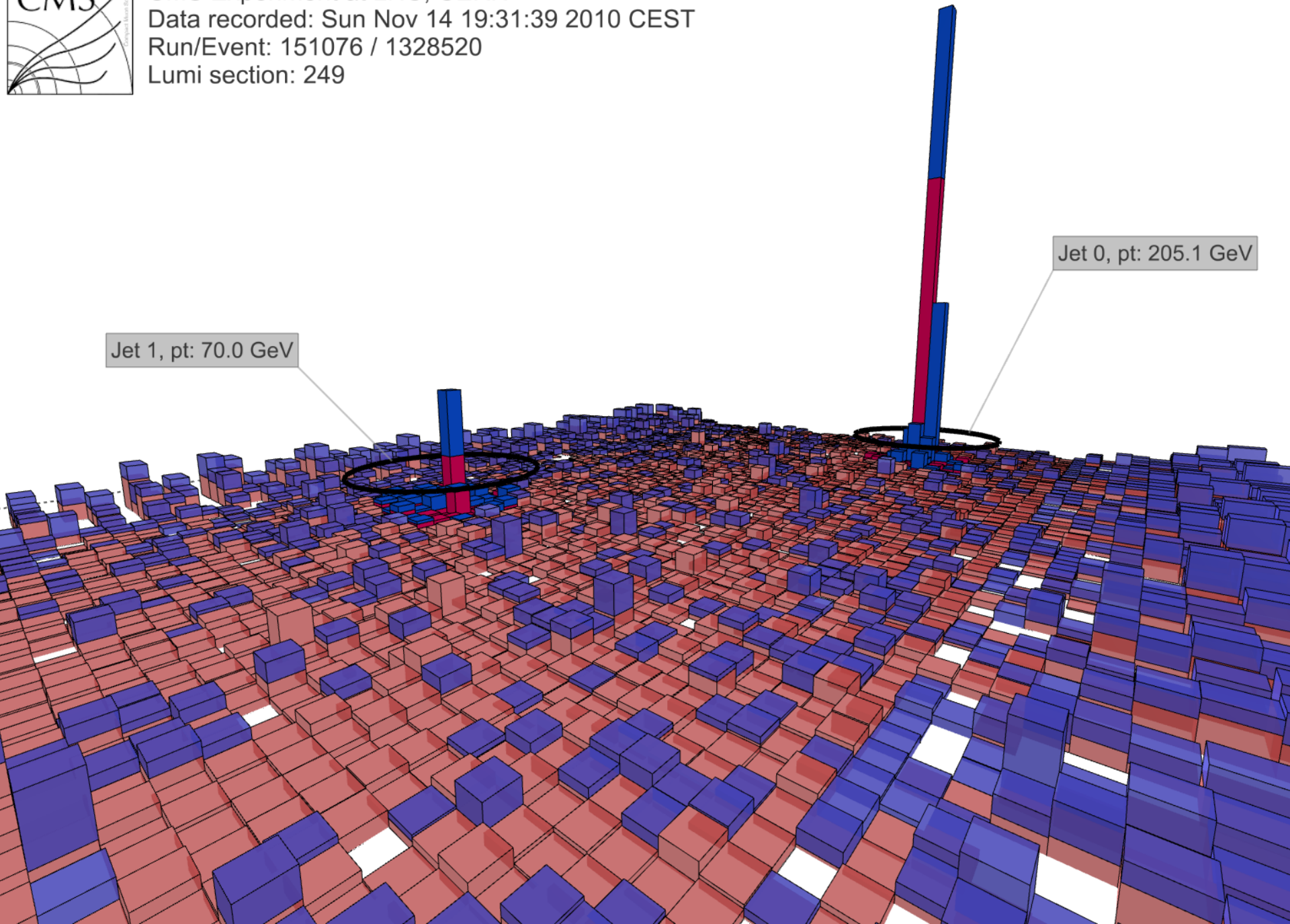
(b)







CMS Experiment at LHC, CERN
Data recorded: Sun Nov 14 19:31:39 2010 CEST
Run/Event: 151076 / 1328520
Lumi section: 249



Jet 1, pt: 70.0 GeV

Jet 0, pt: 205.1 GeV

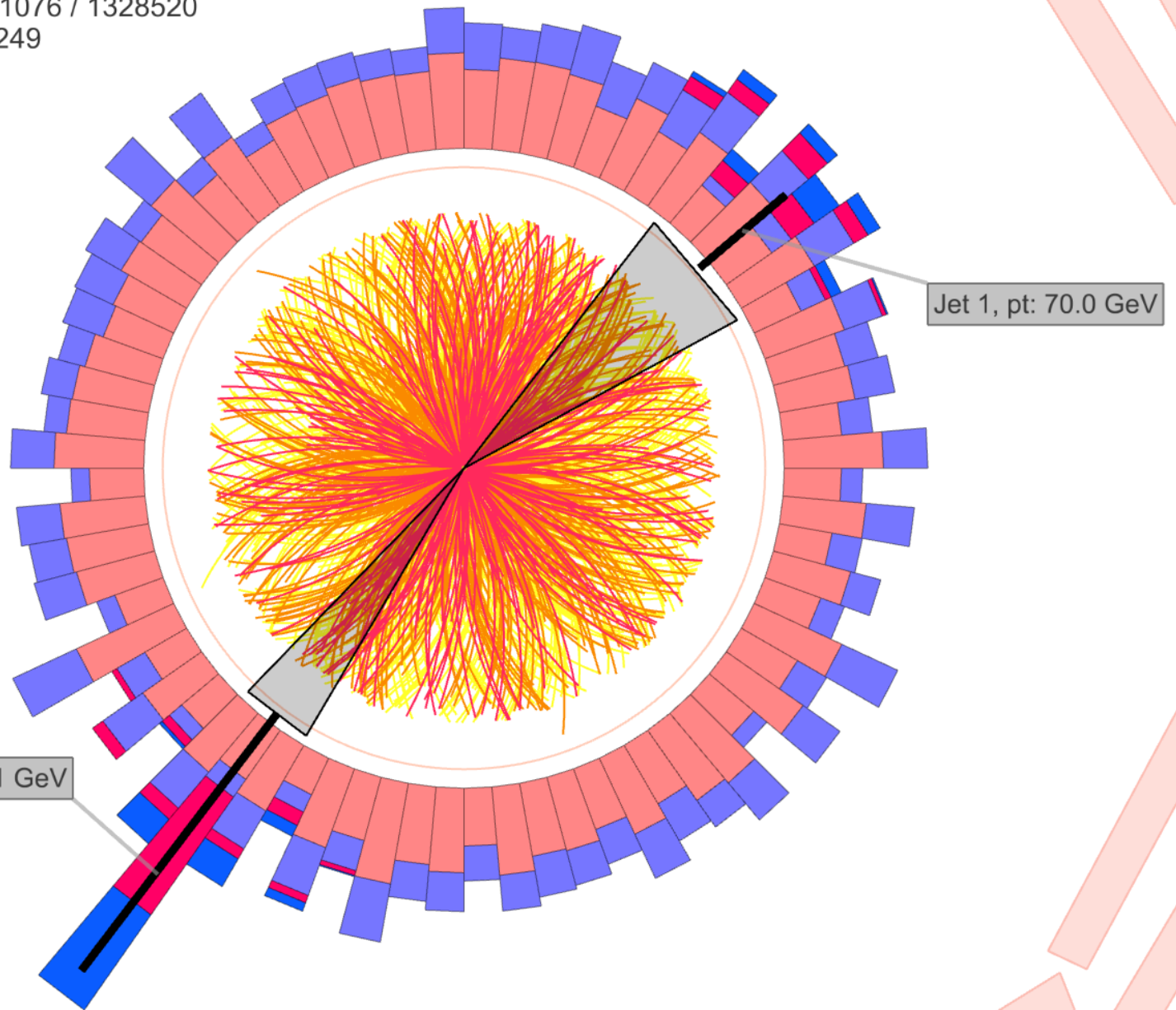


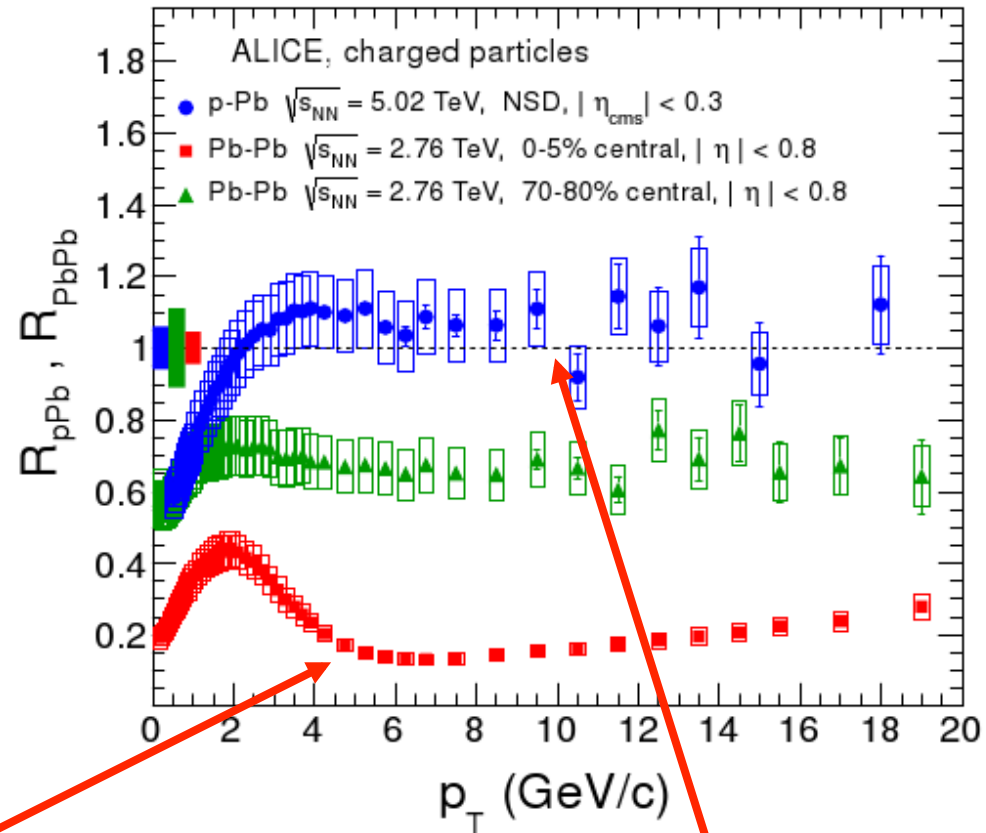
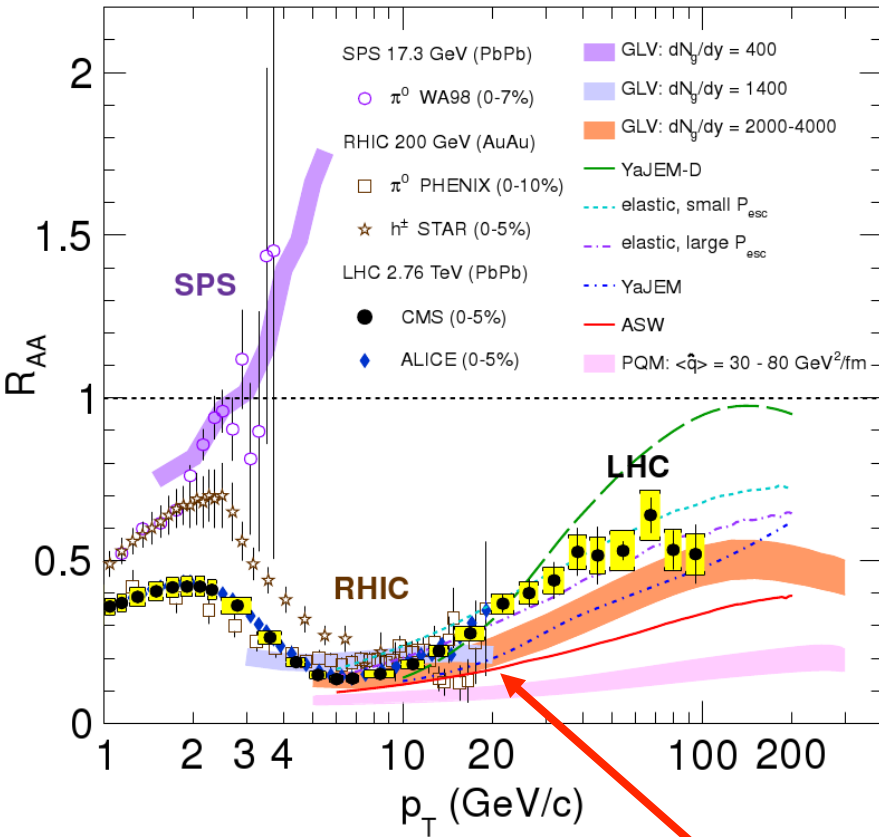
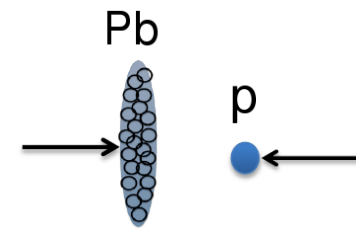
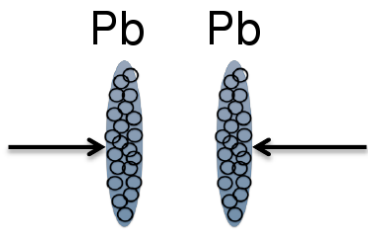
CMS Experiment at LHC, CERN

Data recorded: Sun Nov 14 19:31:39 2010 CEST

Run/Event: 151076 / 1328520

Lumi section: 249





smaller than 1!

about 1!

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- cern.ch/lhcb-public

CERN participants

Django Manglunki, Accelerator Physicist

Detlef Küchler, Ion-Source Physicist

Jan Fiete Grosse-Oetringhaus, ALICE Physicist

Peter Steinberg, ATLAS Physicist

Yen-Jie Lee, CMS Physicist

Yetkin Yilmaz, CMS Physicist

Credits

Freya Blekman — Host

Ken Read — Q&A from Social Media

Kate Kahle — Producer

Achintya Rao — Director

Thank you for watching!



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