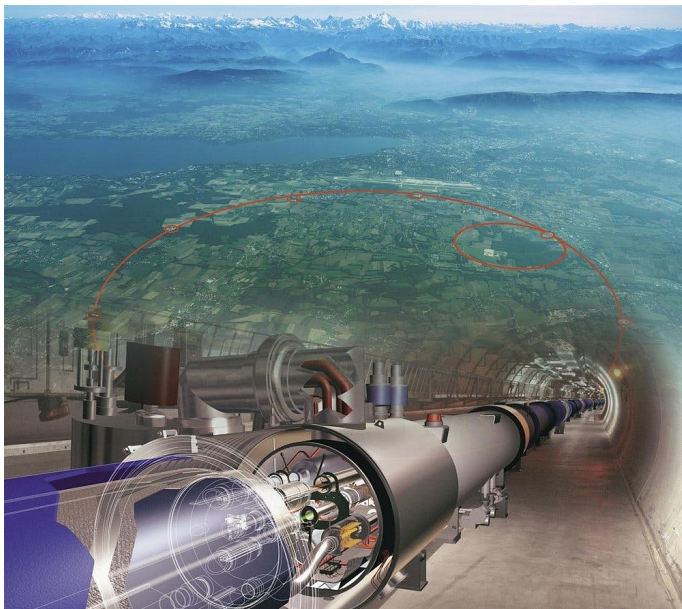
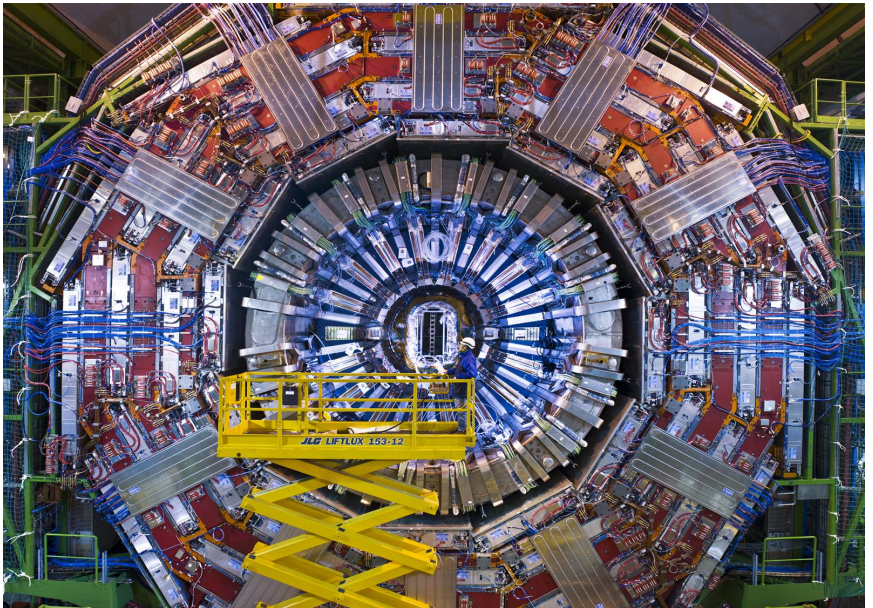


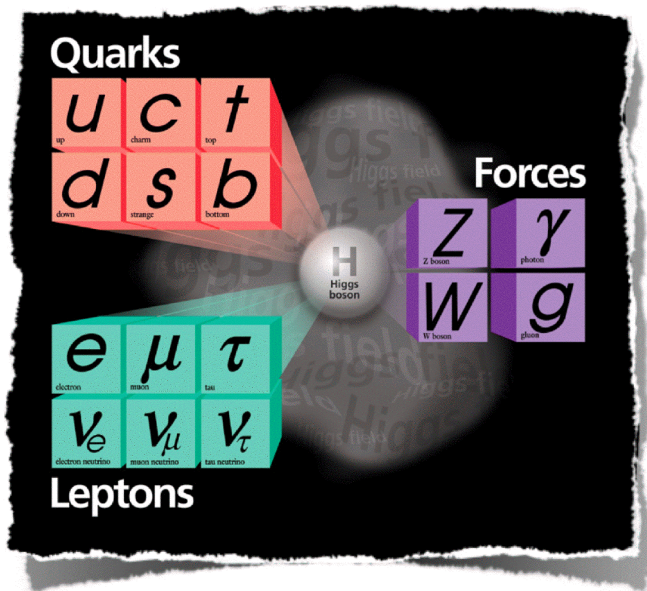
CERN: zoveel meer dan het Higgs-deeltje

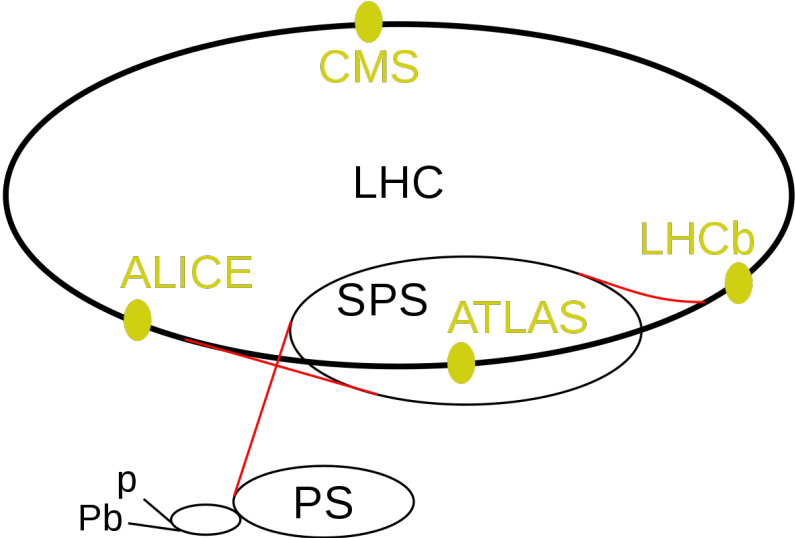


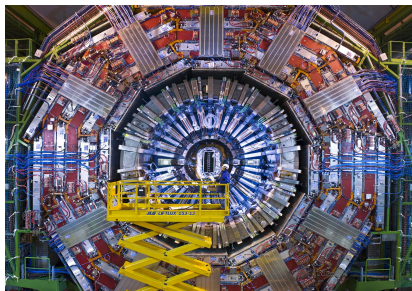




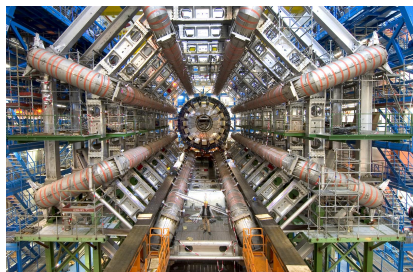
Standaard Model







CMS



ATLAS

2 general-purpose detectoren

- complementair
- bevestigen
- competitie

Higgs deeltje

- meer dan 10 miljoen waargenomen
- in detail eigenschappen bestuderen

"Standaard Model"

- miljarden W en Z bosonen
- biljoenen quarks
- in zeer veel detail bestuderen

Higgs deeltje

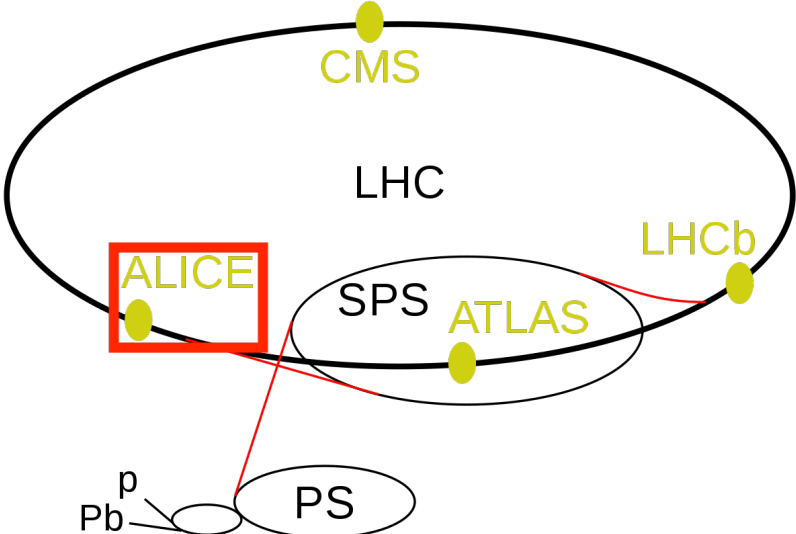
- meer dan 10 miljoen waargenomen
- in detail eigenschappen bestuderen

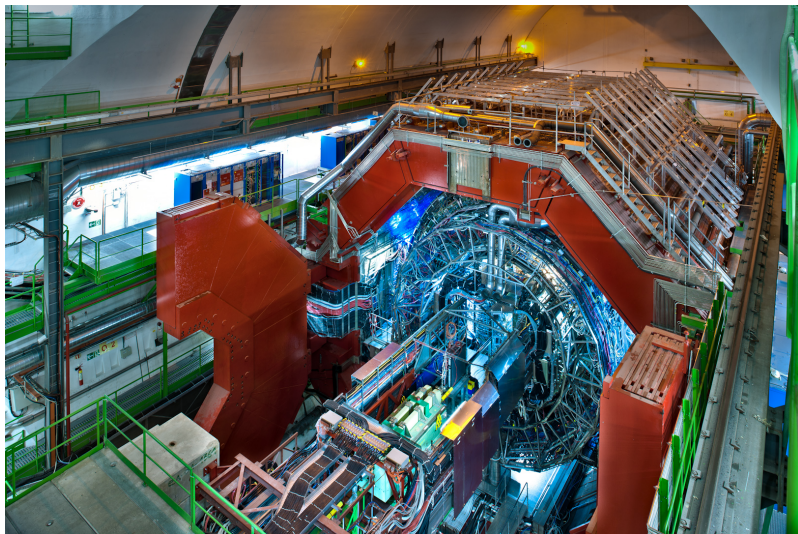
"Standaard Model"

- miljarden W en Z bosonen
- biljoenen quarks
- in zeer veel detail bestuderen

Nieuwe deeltjes, nieuwe fysica

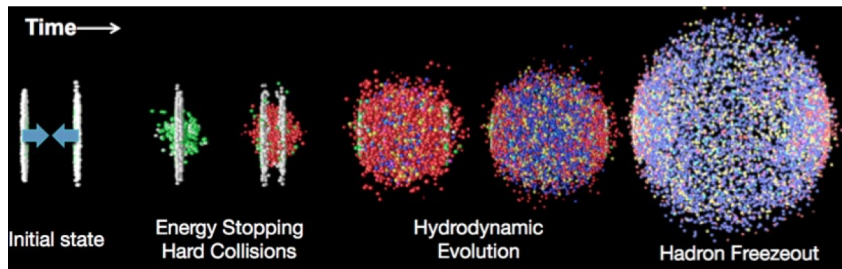
- Supersymmetrie modellen zo goed als uitgesloten
- geen teken van nieuwe deeltjes tot massa $1000 \times M_p$



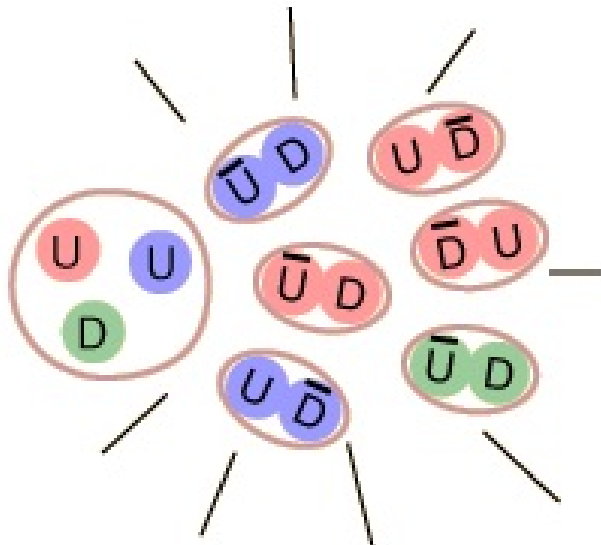


ALICE

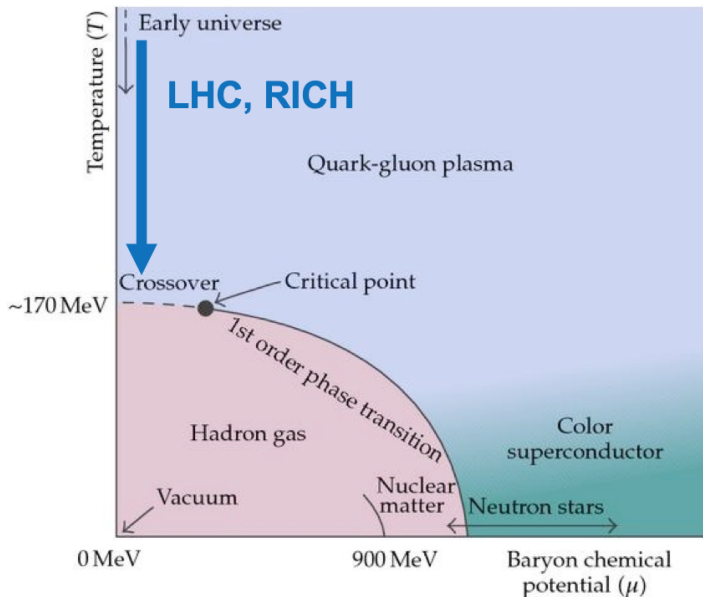
Pb - Pb botsingen



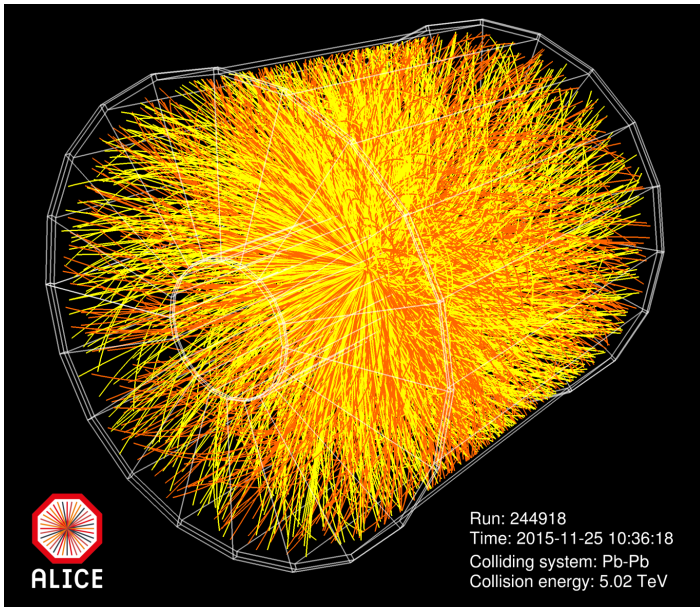
Pb - Pb botsingen

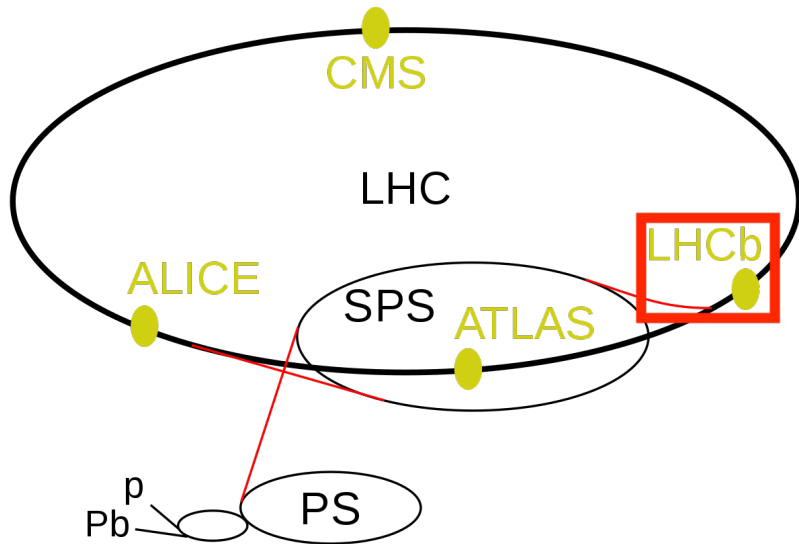


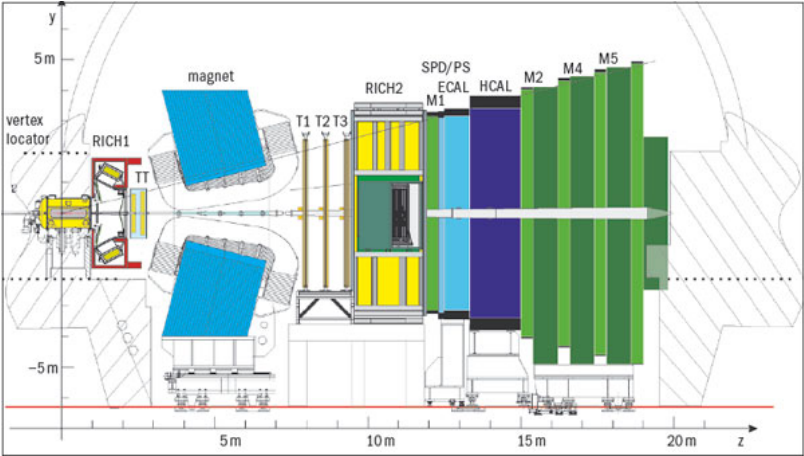
Pb - Pb botsingen



Pb - Pb botsingen

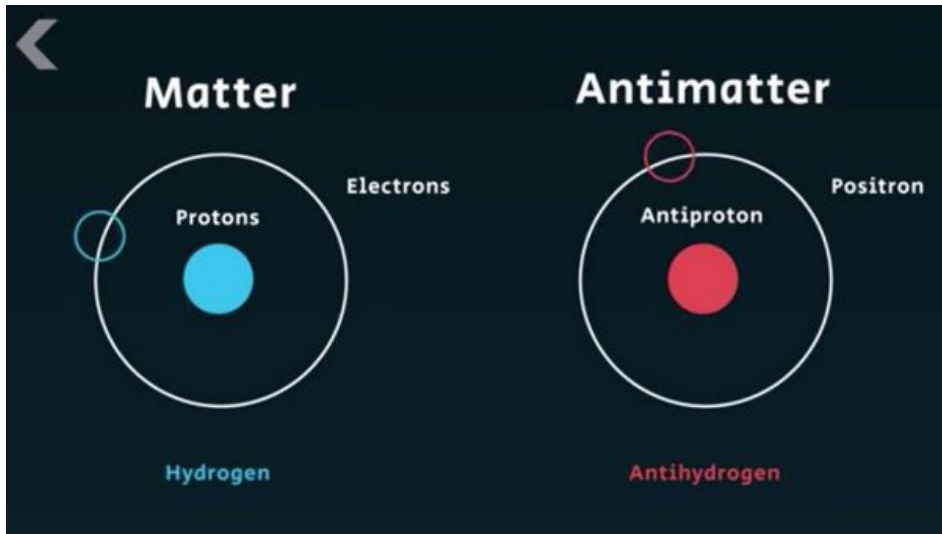




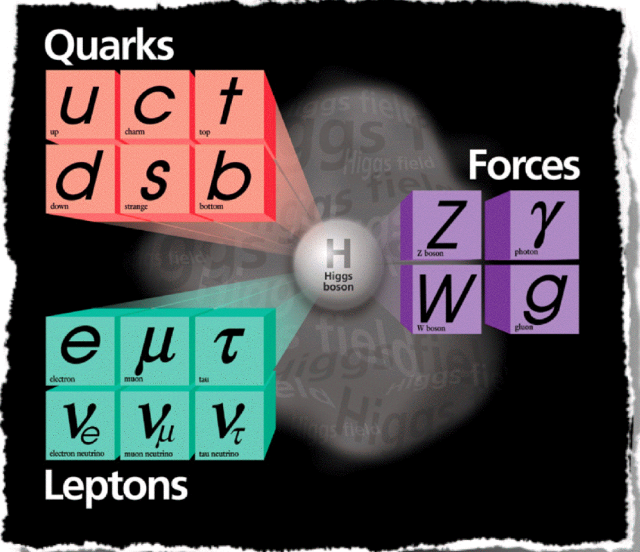


LHCb

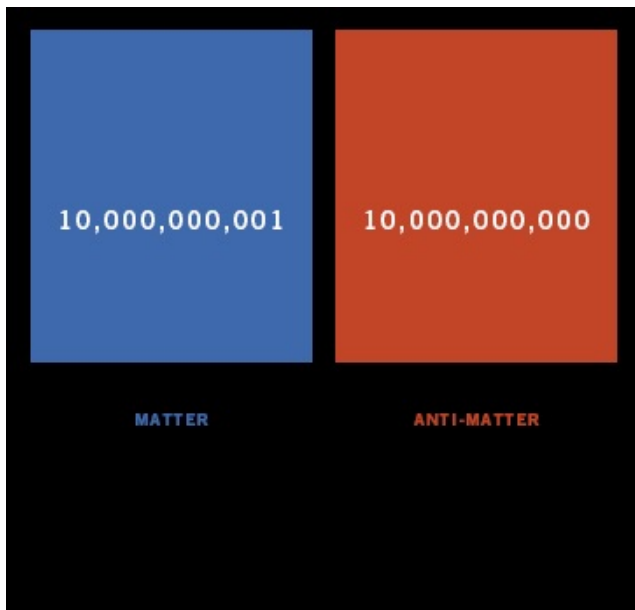
Materie - antimaterie



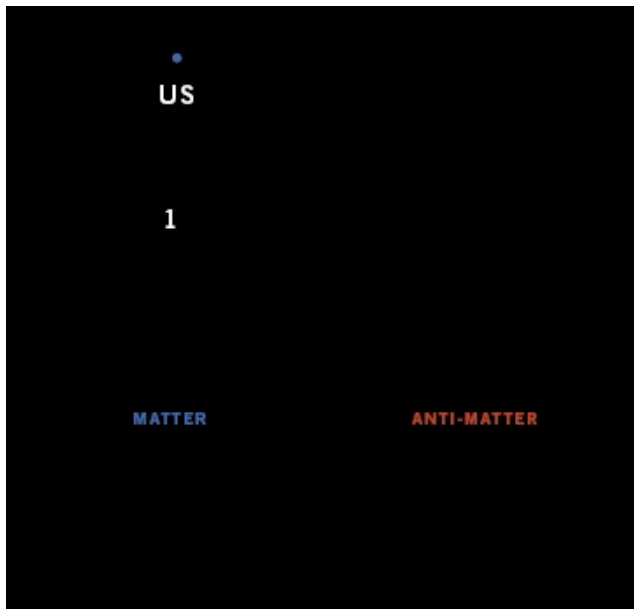
Materie - antimaterie



Materie - antimaterie

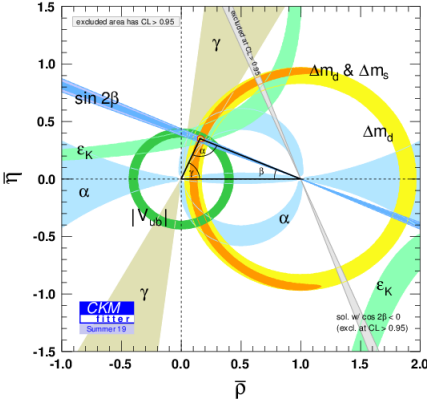


Materie - antimaterie



CP-schending

- verschil tussen deeltje (bv. B^0) en anti-deeltje (\bar{B}^0)



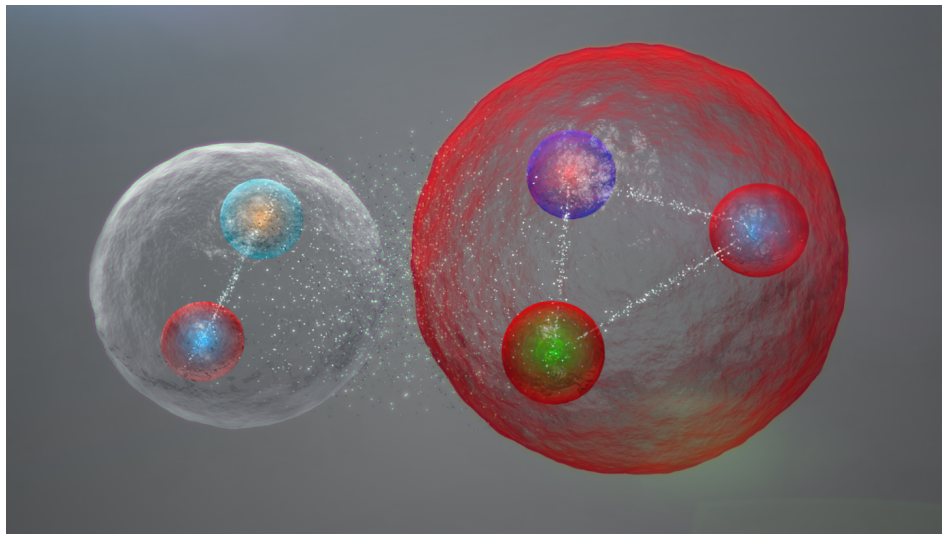
CP-schending

- verschil tussen deeltje (bv. B^0) en anti-deeltje (\bar{B}^0)

"Lepton Flavour Universality"

- behalve massa: $e \equiv \mu \equiv \tau$
- maar: consistent te weinig μ in verval b -quark

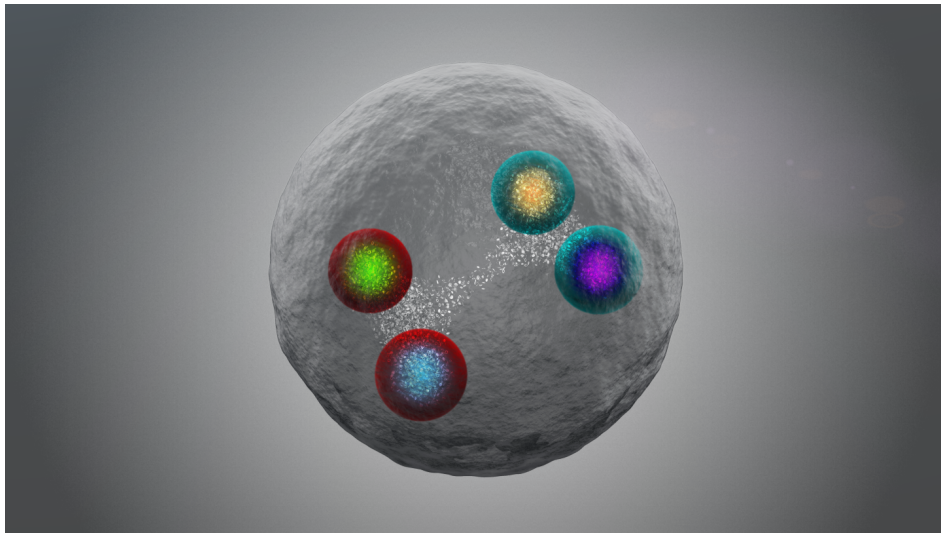
LHCb: nieuwe deeltjes



Meson

Baryon

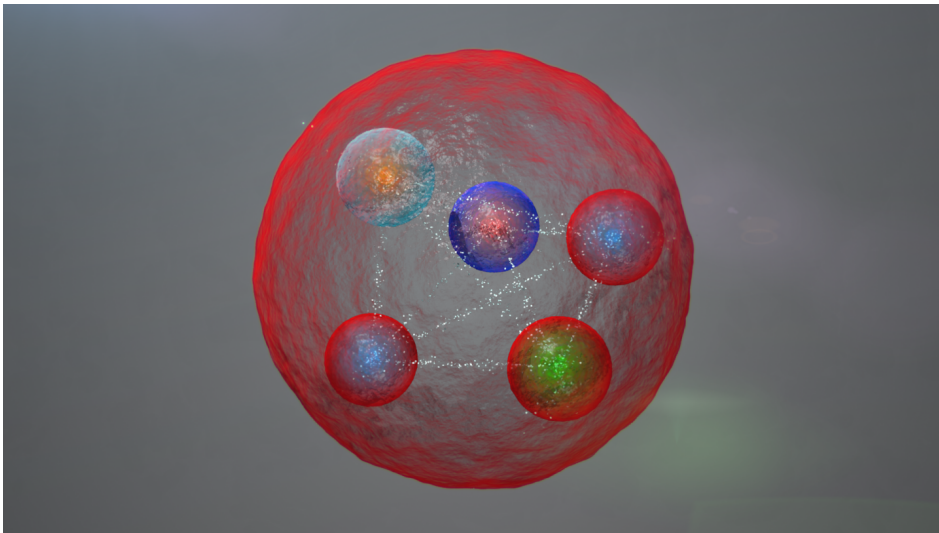
LHCb: nieuwe deeltjes



Tetraquark



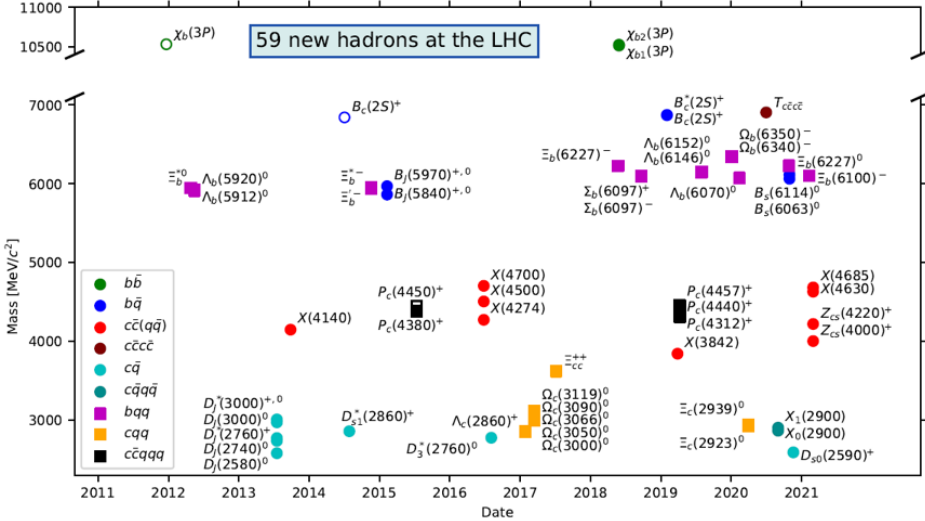
LHCb: nieuwe deeltjes



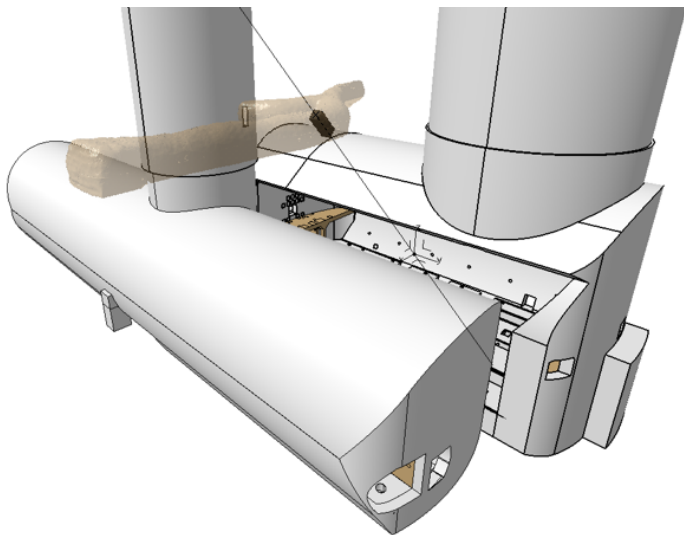
Pentaquark



LHCb: nieuwe deeltjes

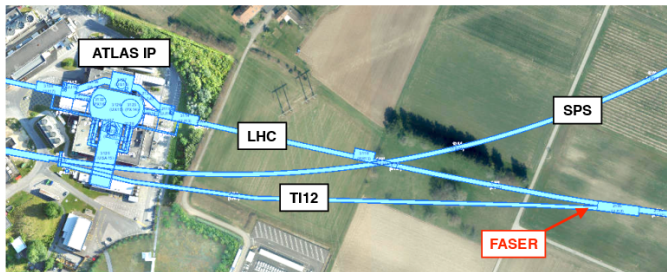


LHC: eindeloos veel detectoren



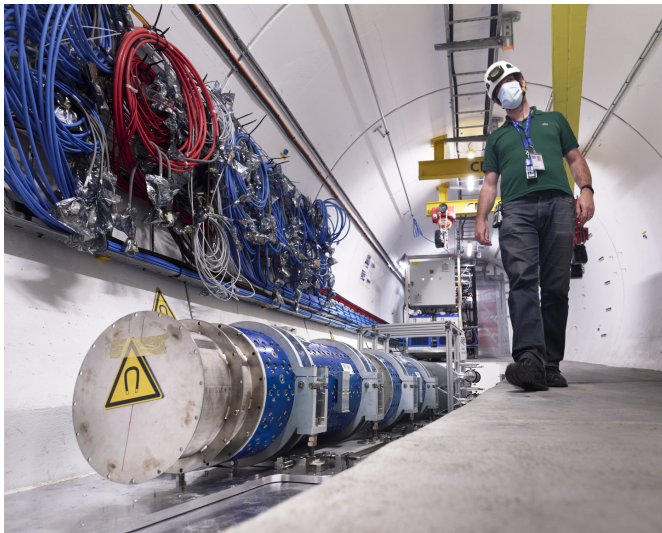
milliQan

LHC: eindelijk veel detectoren



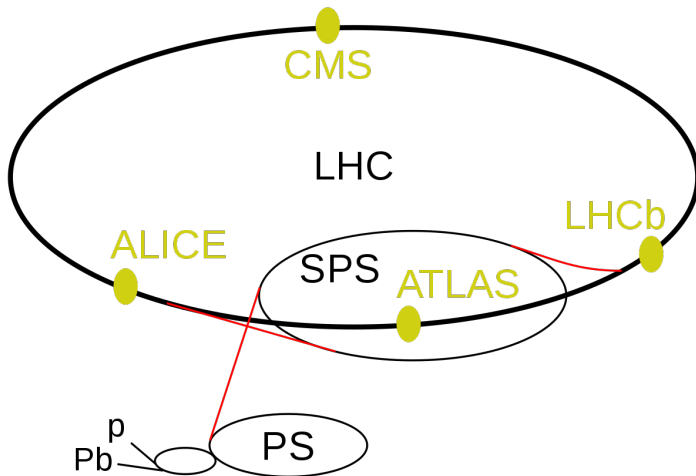
FASER

LHC: eindelijk veel detectoren



FASER

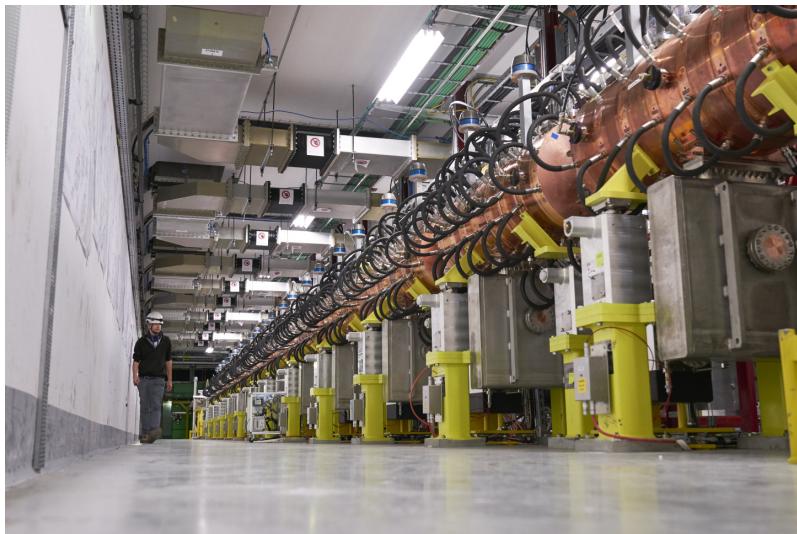
LHC: meer dan een versneller



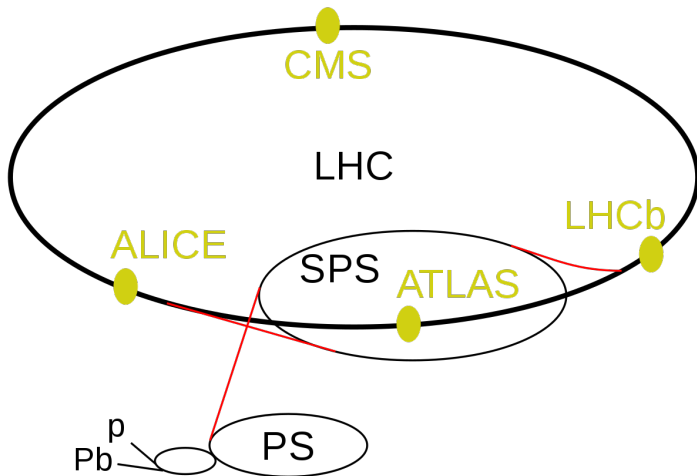
LHC: meer dan een versneller



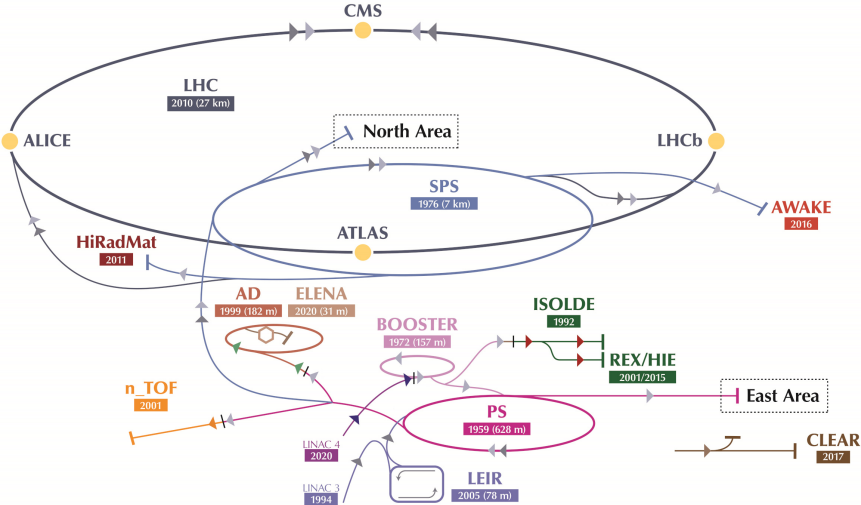
LHC: meer dan een versneller



LHC: meer dan een versneller



CERN versnellers



North Area



North Area

deeltjesbundels

- bundels van p, π, μ, K, ν
- testen van detectoren
- enkele experimenten (NA61, NA62, COMPASS, ...)

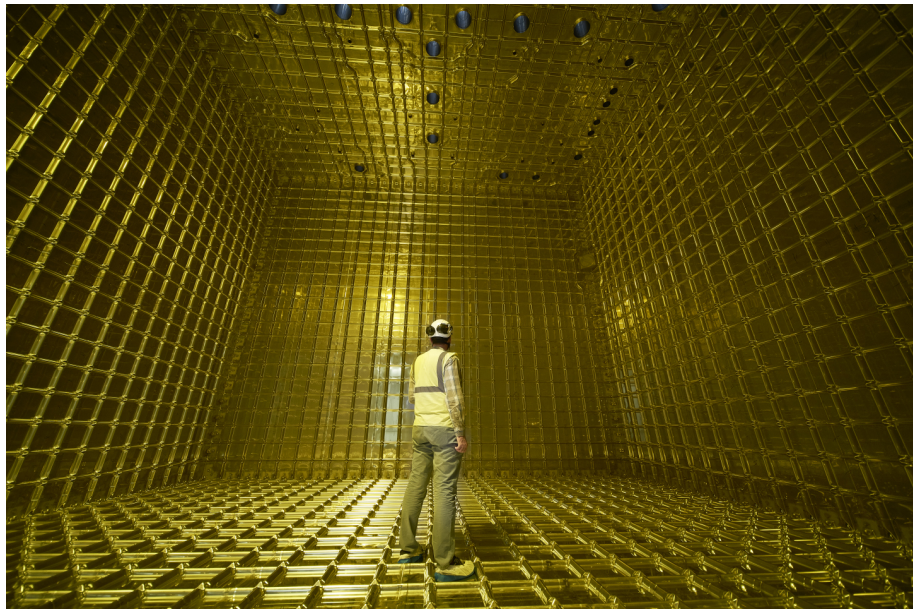
NA62

- zoekt naar zeldzaam verval K^+ -deeltje
- 1/10 000 000 000 verval $K^+ \rightarrow \pi^+ \nu \bar{\nu}$

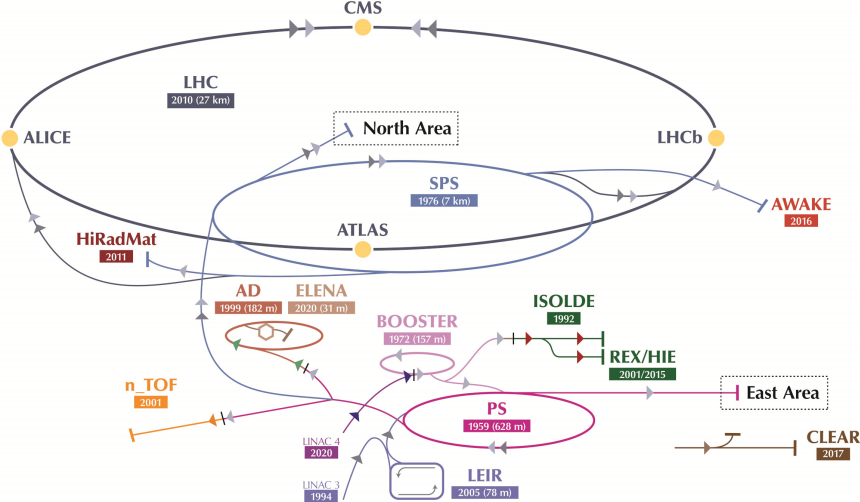
neutrino-platform

- test-opstelling voor DUNE experiment in de VS
- schaal 1/20 van volledige detector
- vloeibaar Ar

North Area



CERN versnellers



Antimaterie

AD - ELENA

- antiprotonen worden **vertraagd** in AD (en ELENA)
- antiprotonen worden opgeslagen in ELENA (sedert 2021)
- verdeeld over experimenten (GBAR, AEGIS, ALPHA, ASACUSA, ATRAP)

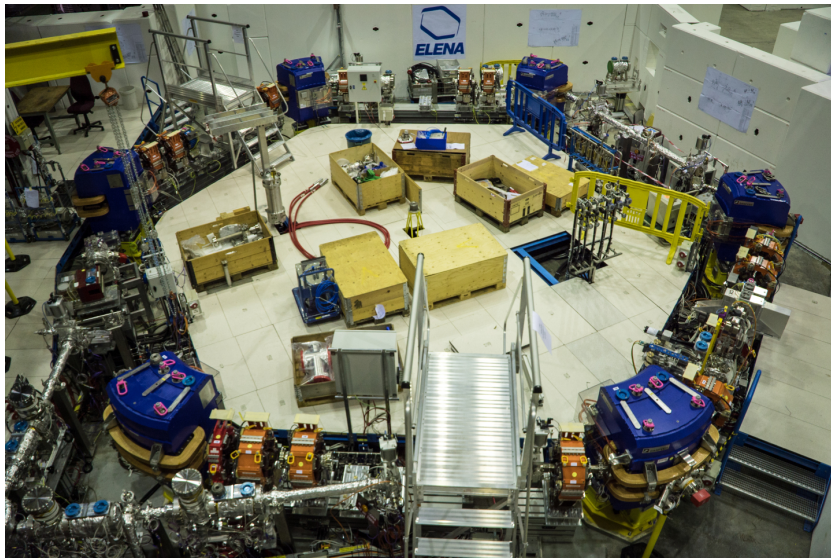
Antiwaterstof

- antiproton + anti-electron
- identiek aan waterstof?

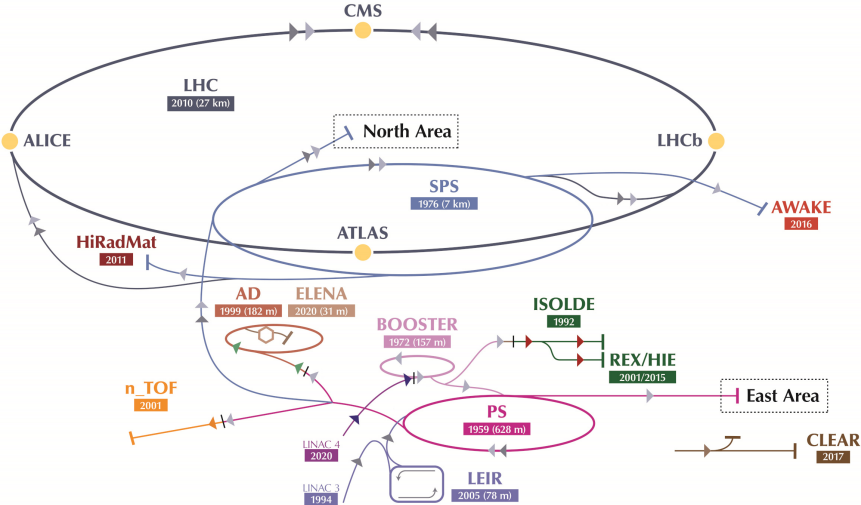
GBAR

- maakt \bar{H}^+ (antiproton + 2 anti-electronen)
- valt een antideeltje even snel als een deeltje?

Antimaterie



CERN versnellers



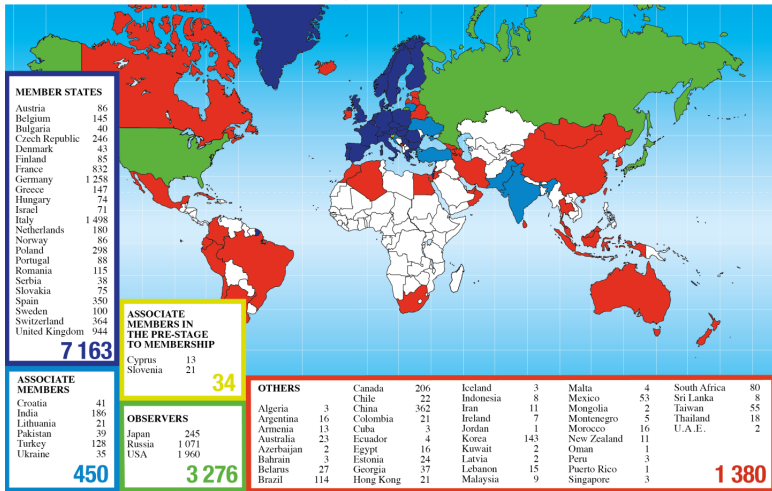
AWAKE

- gebruikt plasma en proton-bundel om electronen te versnellen
 - ▶ "gewone" versneller: 6 MV/m
 - ▶ AWAKE: 200 MV/m
 - ▶ doel: 1000 MV/m
- ⇒ versneller kan 100x korter zijn

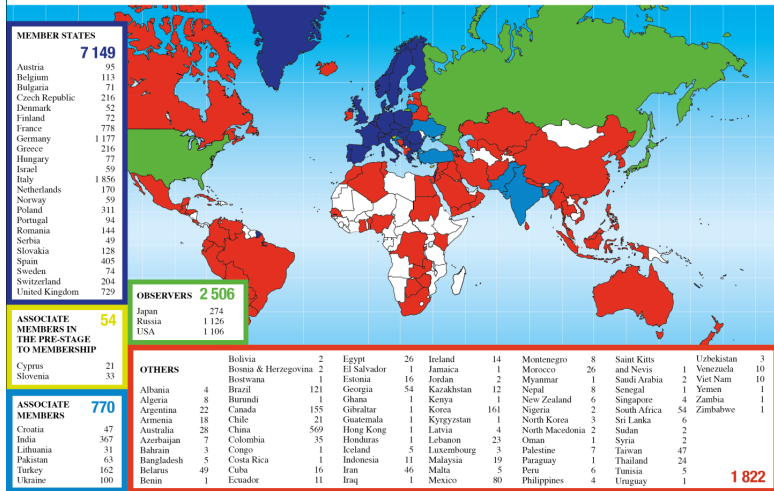
AWAKE



Distribution of All CERN Users by Location of Institute on 27 January 2020



Distribution of All CERN Users by Nationality on 27 January 2020



CERN mensen



CERN mensen

