



Willkommen!

CERN@home

Donnerstag 29.04.2021



NETZWERK
TEILCHENWELT

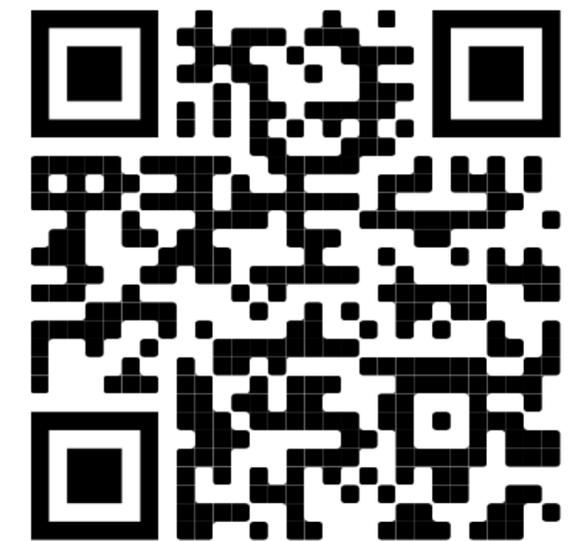


Programm

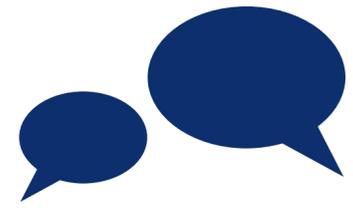


Donnerstag 29.04

14:00 - 14:30	Begrüßung & Kennenlernen
14:30 - 15:30	Einführungsvortrag: Das CERN
15:30 - 16:15	Virtuelle Führung Anti-Materie-Fabrik
16:15 - 16:30	PAUSE
16:30 - 17:00	Q&A mit Sascha Mehlhase
17:00 - 17:15	Vorstellung Netzwerk Teilchenwelt
17:15 - 17:30	PAUSE
17:30 - 19:00	Digital Escape-Game



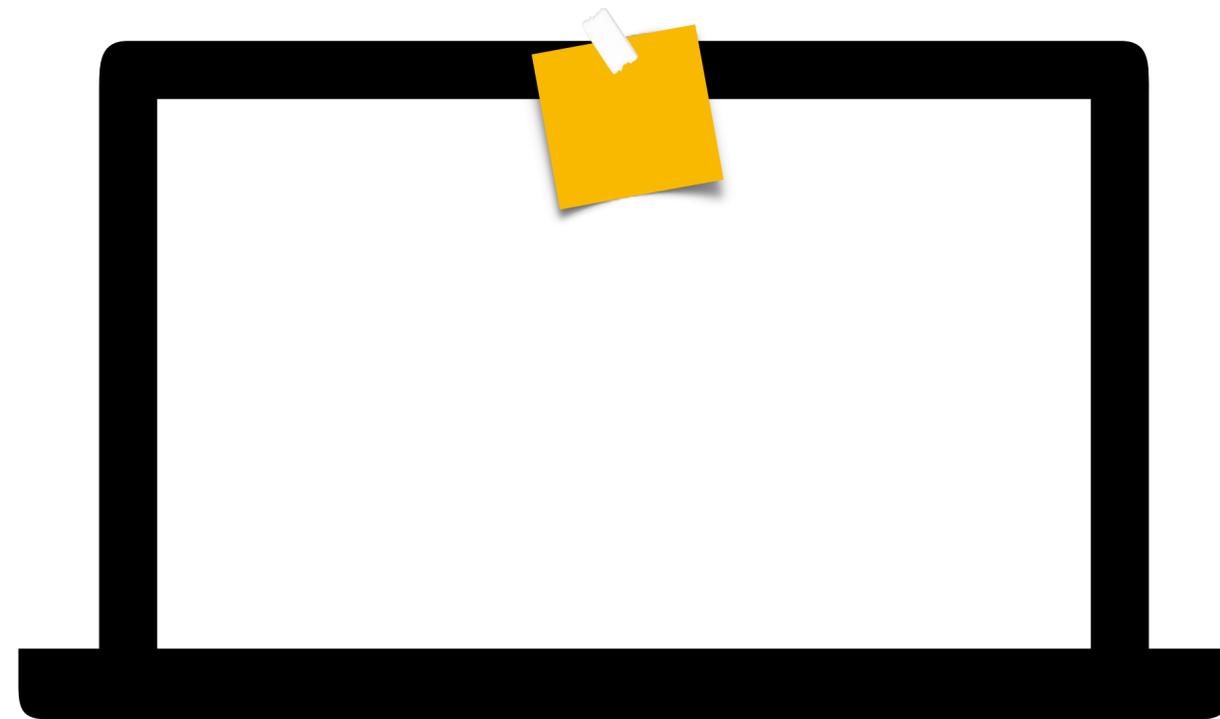
<https://indico.cern.ch/event/1013260/timetable/>



Kennenlernen

Post-it Aktivität

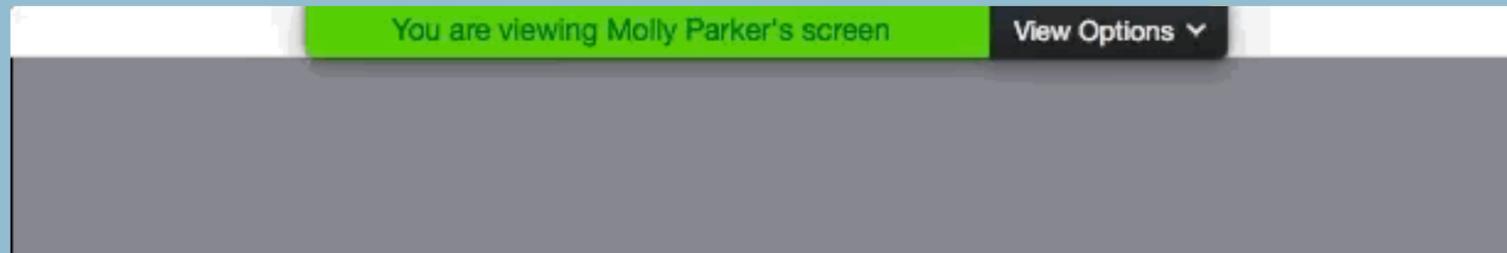
- Klebt eure Kamera ab.
- Wenn die Aussage auf euch zutrifft, dann nehmt das Post-it ab.



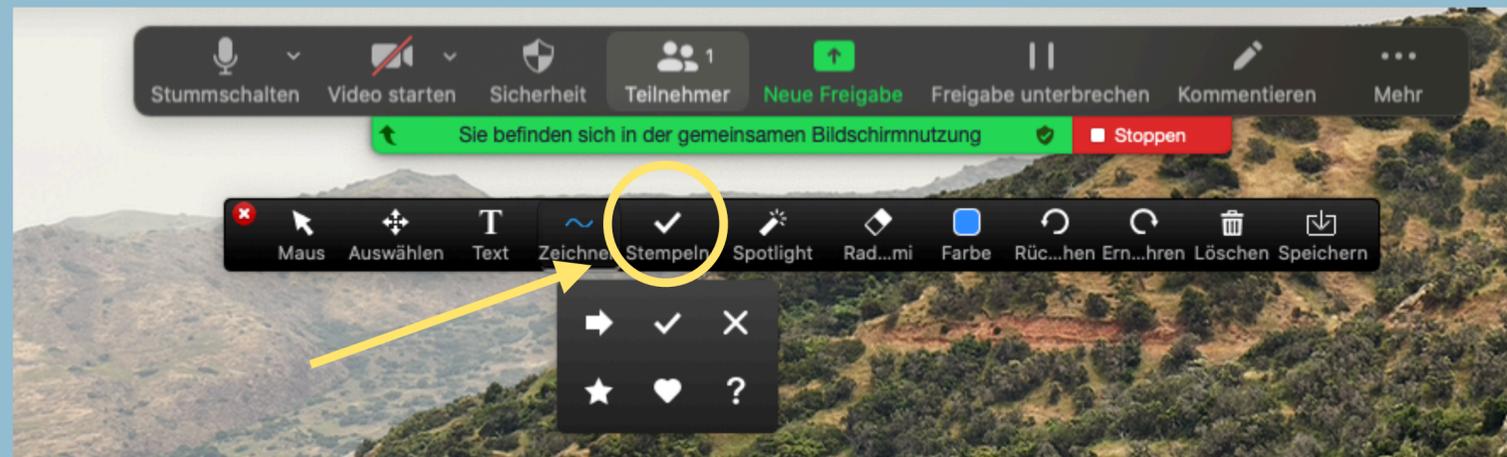
Zum Aufwärmen

Stimme mit ab was
Nutze dafür die Sticker-Funktion von Zoom.

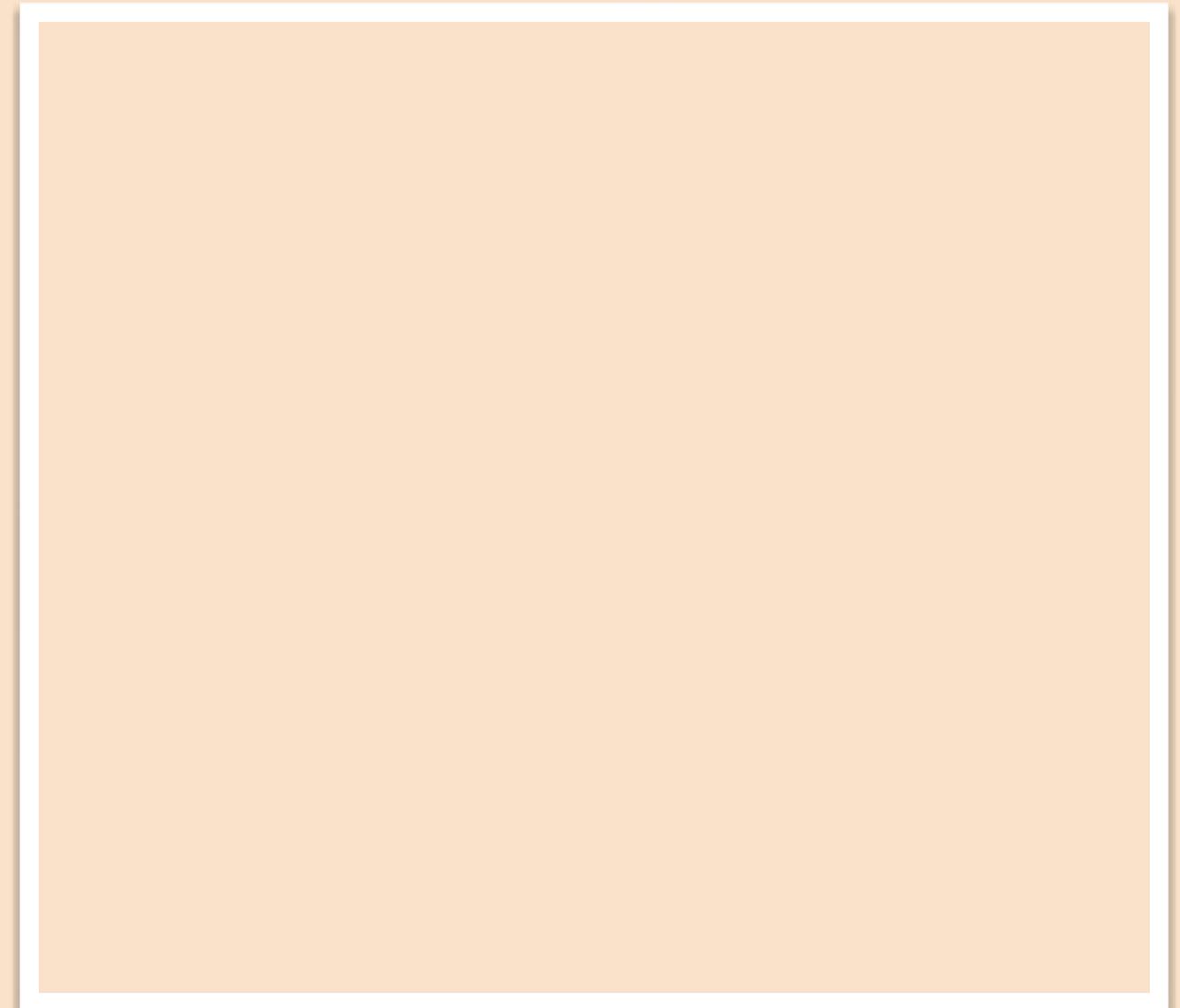
Dafür in der oberen Menüleiste „**Kommentieren**“ auswählen:



Anschließend einfach einen **Stempel** Deiner Wahl wählen:

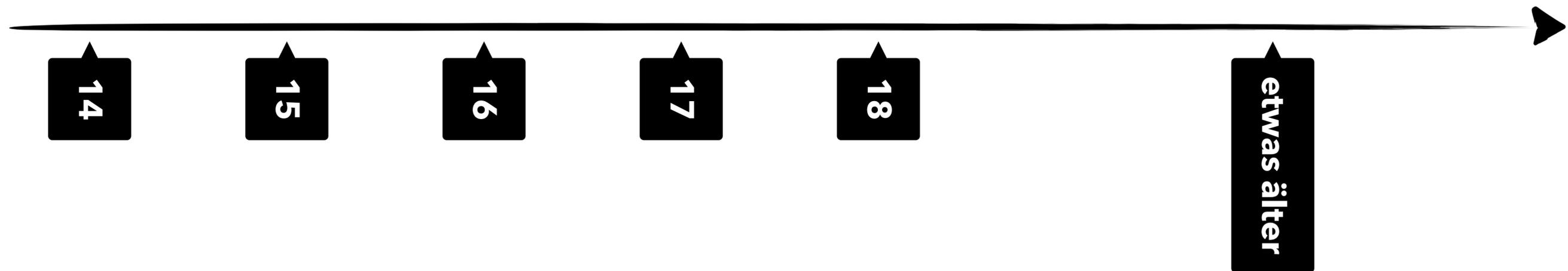


Bitte einmal Stempeln...



Kennenlernen

Wie alt bist Du?



Kennenlernen

Woher bist Du zugeschaltet?

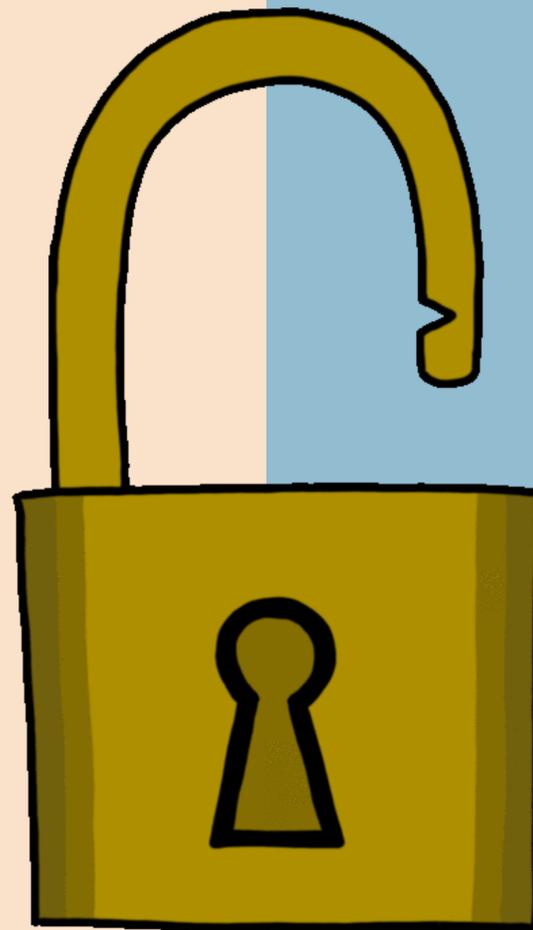


Escape Game

Ich habe schon mal ein Escape-Game gemacht.

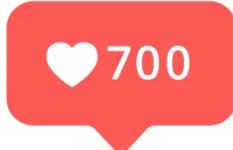


Klaro, ich bin Profi!

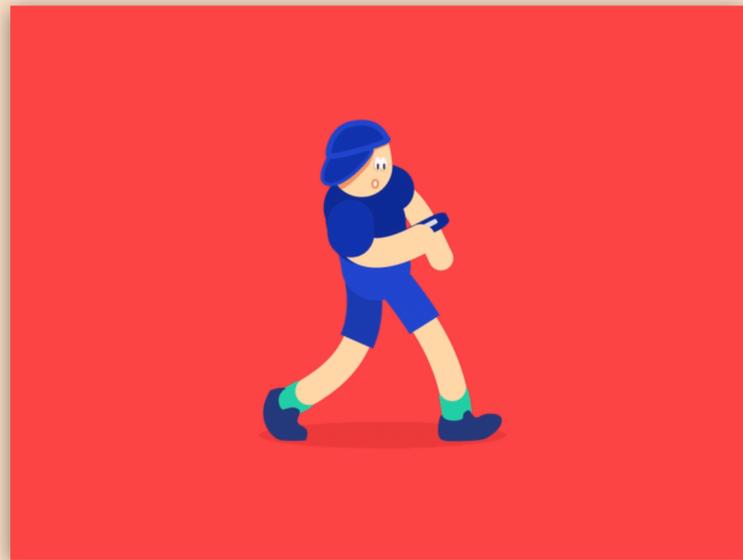


Leider noch nicht.

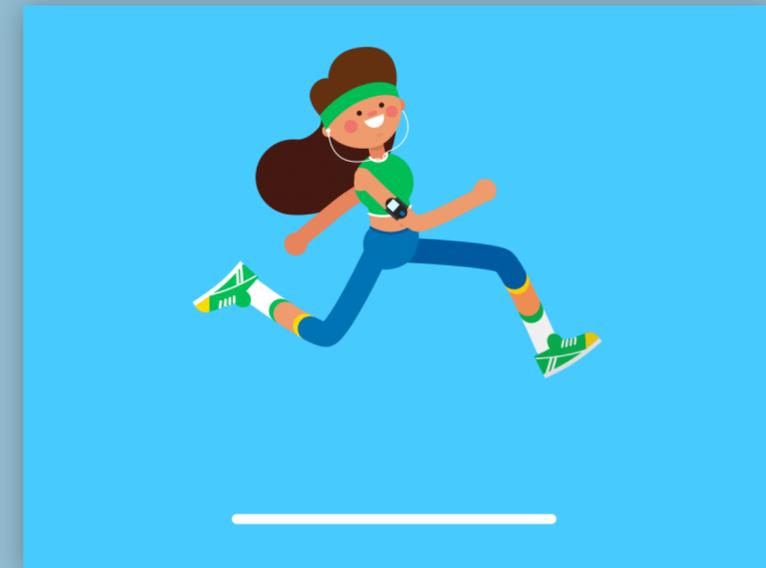
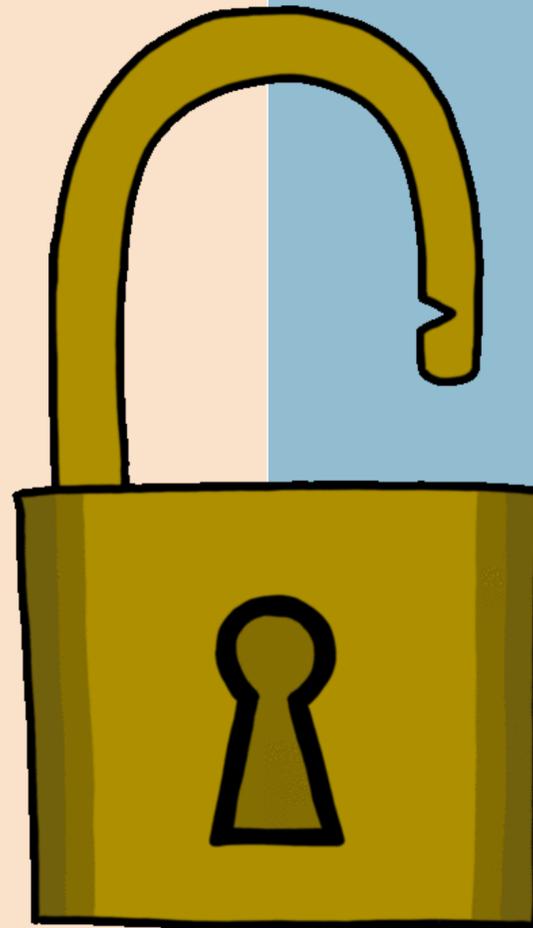
Escape Game



Ich habe einen Instagram Account



Ich bin quasi Influencer*in



Bleib mir weg damit!

Kennenlernen

Lieblingsfächer?

Deutsch

Französisch

Geschichte

Mathematik

Kunst

Musik

Biologie

Sport

Wirtschaft

Chemie

Geografie

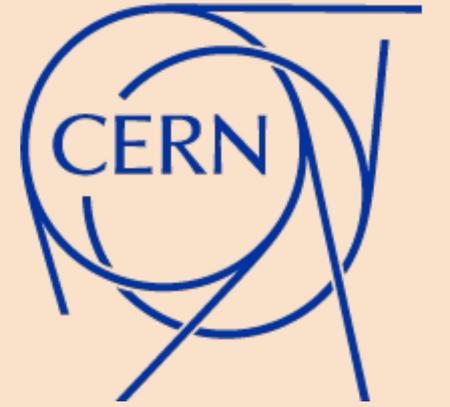
Informatik

Englisch

Religion

Kennenlernen

Ich war schon Mal am CERN



Kennenlernen

Ich habe schon an einer
Masterclass teilgenommen

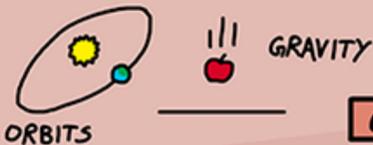


CLASSICAL PHYSICS

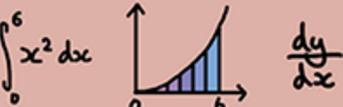


LAW OF UNIVERSAL GRAVITATION

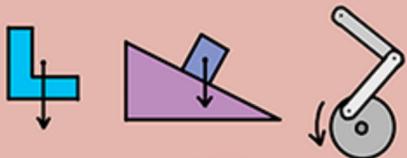
LAW OF MOTION



CALCULUS



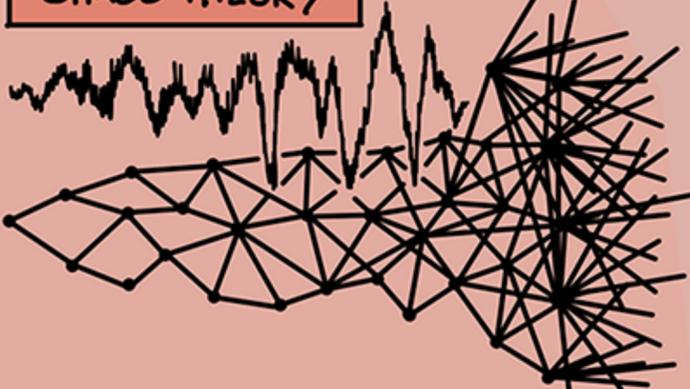
CLASSICAL MECHANICS



FLUID MECHANICS



CHAOS THEORY



THERMODYNAMICS

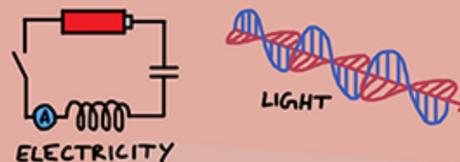
ENERGY



HEAT TEMPERATURE



ELECTROMAGNETISM

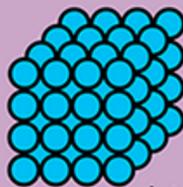


ELECTRIC FIELDS

MAGNETIC FIELDS



CONDENSED MATTER PHYSICS



QUANTUM INFORMATION

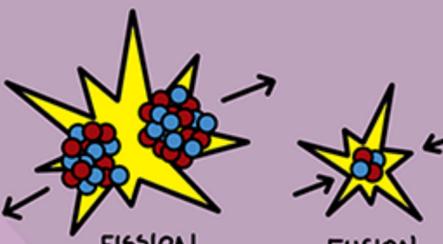
COMPUTERS

LASERS

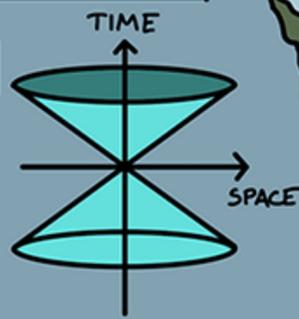
ATOMIC THEORY



NUCLEAR PHYSICS



SPECIAL THEORY OF RELATIVITY



$$E=mc^2$$

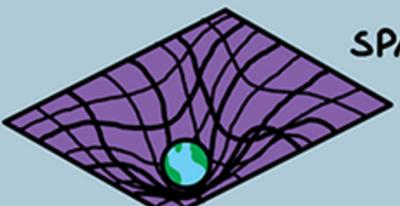
QUANTUM FIELD THEORY



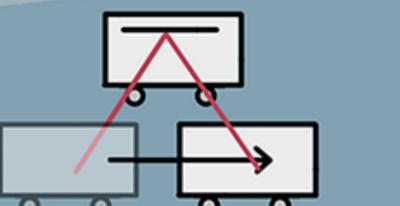
QUANTUM ELECTRODYNAMICS

THE STANDARD MODEL

GENERAL THEORY OF RELATIVITY



SPACETIME



ASTROPHYSICS

REFLECTION REFRACTION DIFFRACTION



WAVES

TRANSVERSE



LONGITUDINAL



PHILOSOPHY

PHILOSOPHY OF SCIENCE

FREE WILL

HOW COME?

NATURE OF REALITY

JUST...WHY?

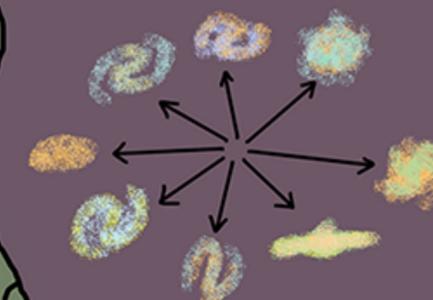
THE CHASM OF IGNORANCE

QUANTUM GRAVITY

STRING THEORY

LOOP QUANTUM GRAVITY

DARK ENERGY



DARK MATTER



AND MANY MORE...

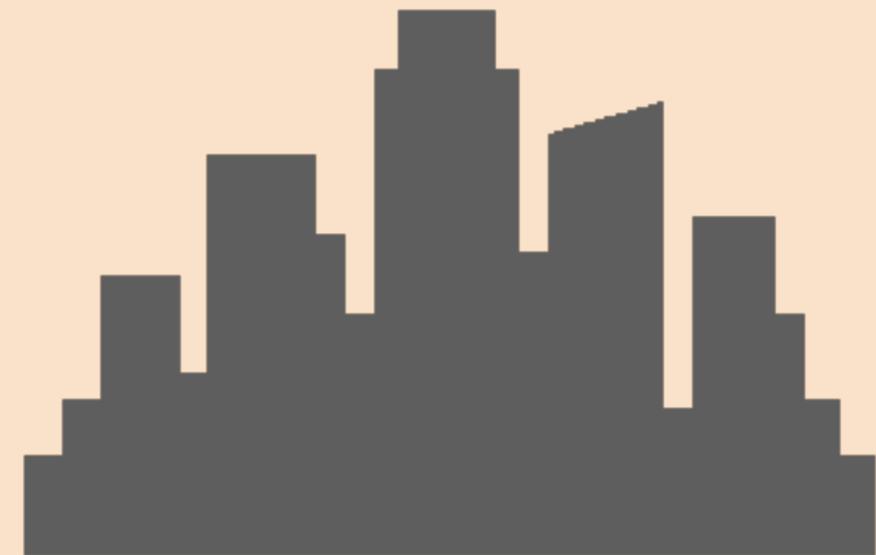
QUANTUM PHYSICS

YOUTUBE.COM/USER/DOMINICWALLIMAN @DOMINICWALLIMAN

Größerer jährlicher Stromverbrauch?



Das ganze CERN Gelände im Betrieb

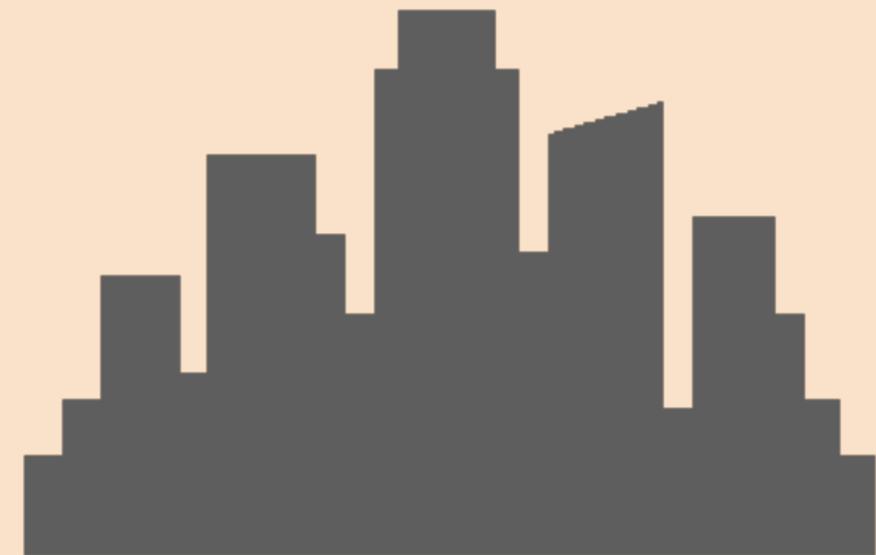


Der gesamte Kanton Genf

Größerer jährlicher Stromverbrauch?

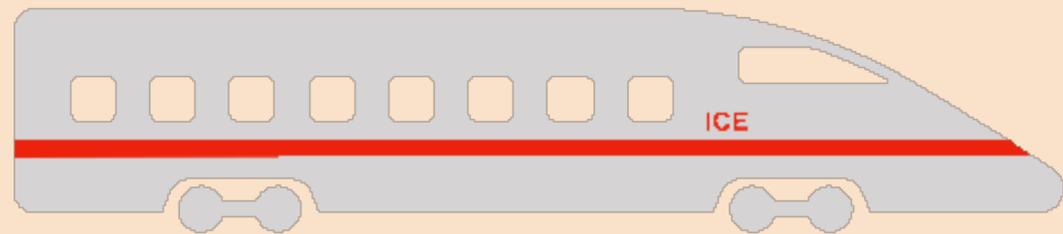


1,2 TWh

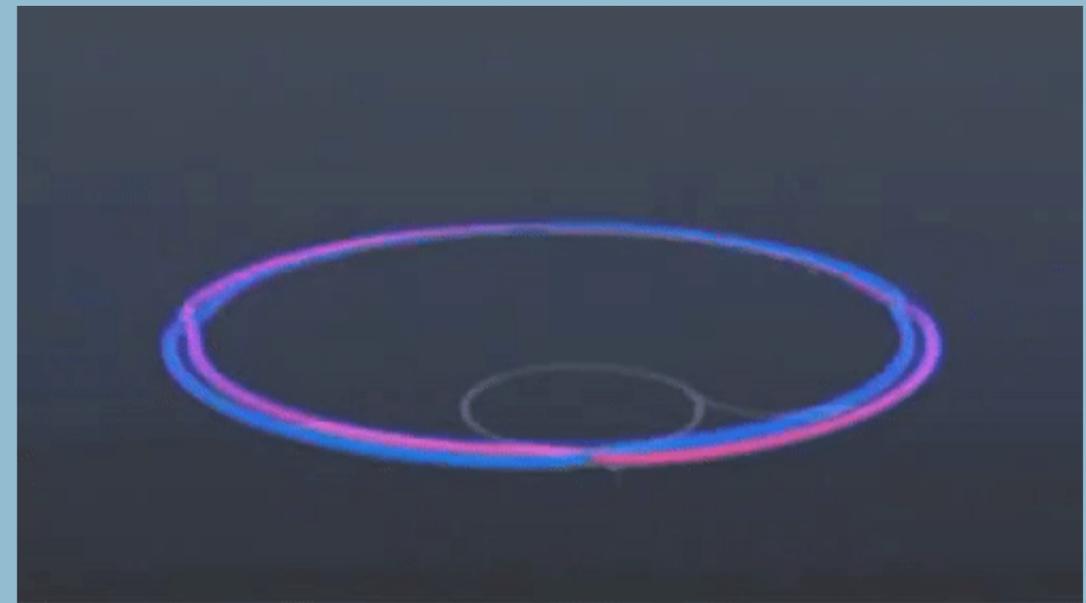


3 TWh

Was hat mehr Energie?

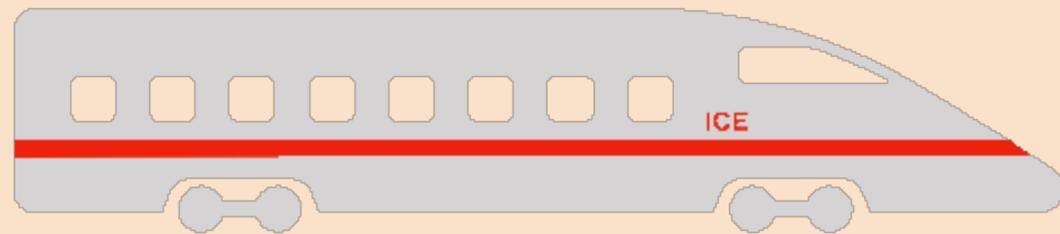


Ein 280t ICE bei 180km/h



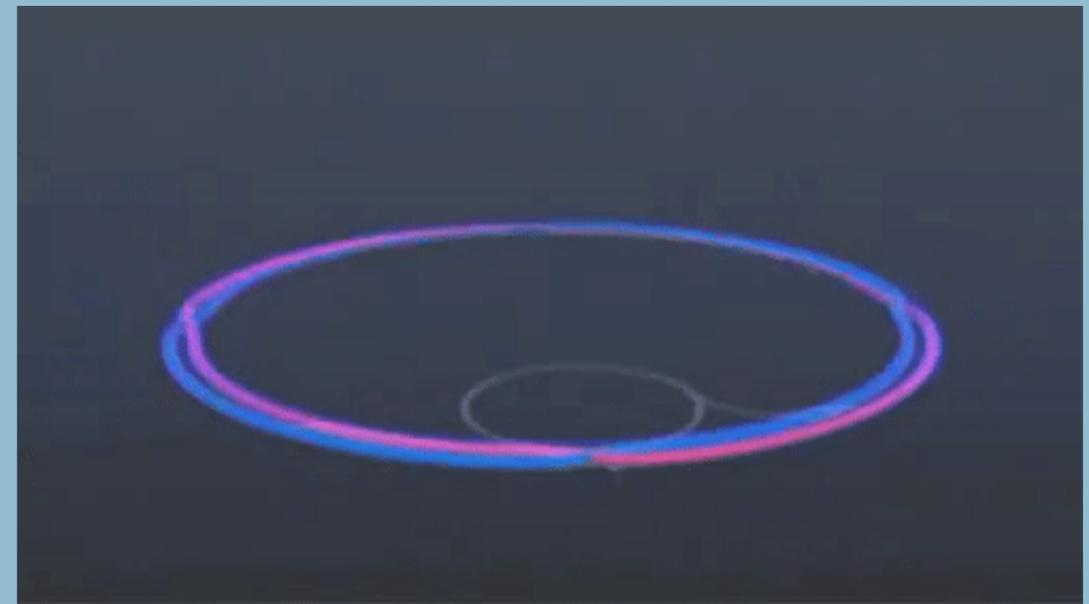
Ein Gesamtstrahl im LHC bei voller Energie

Was hat mehr Energie?



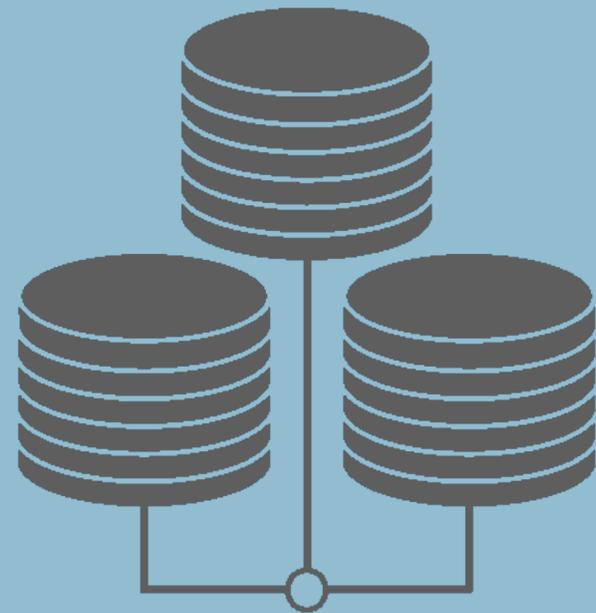
350 MJ

**2808 Pakete · 1,15 · 10¹¹ Protonen @ 7 TeV = 362 MJ*



362 MJ*

Wo liegen mehr Daten?



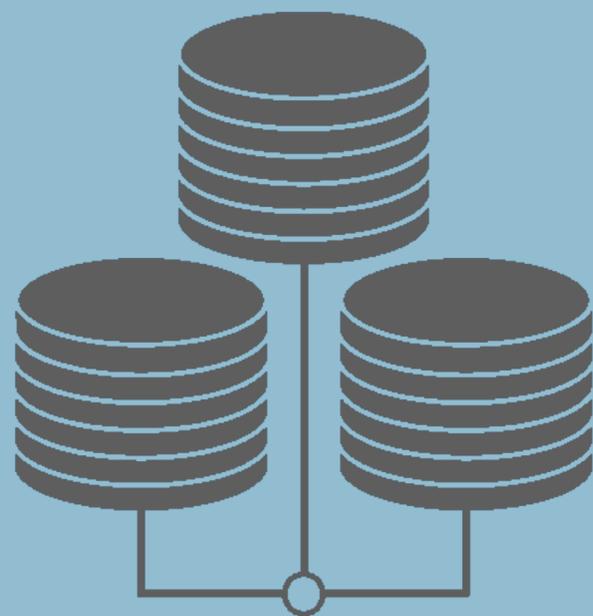
Im CERN Datenzentrum



Auf den Servern von YouTube

Wo liegen mehr Daten?

1 PB = 1000 TB



200 PB

1 EB = 1000 PB = 10^6 TB

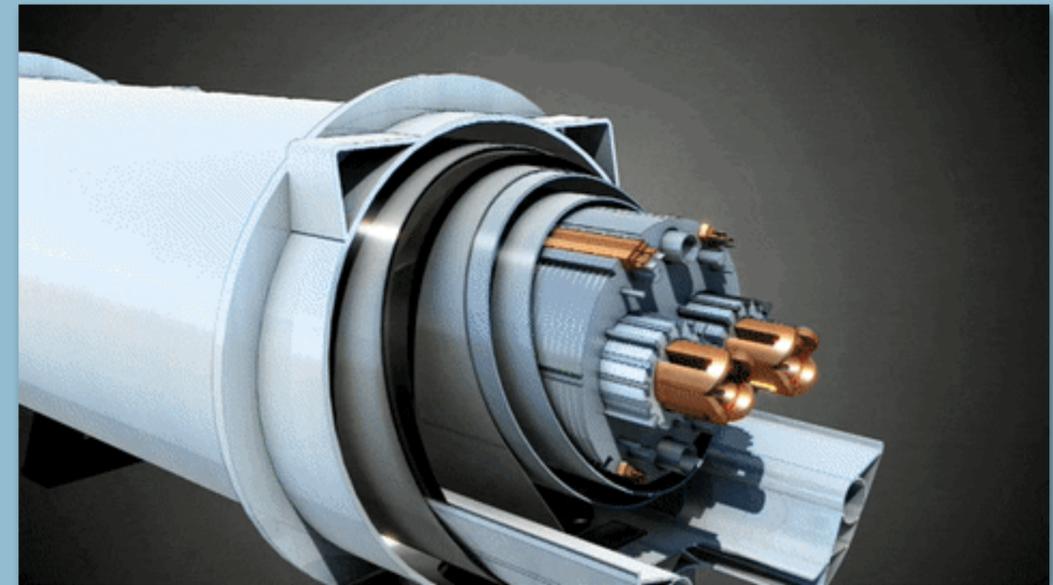


Einige EB

Wo ist es kälter?



Auf der Mondoberfläche bei Nacht

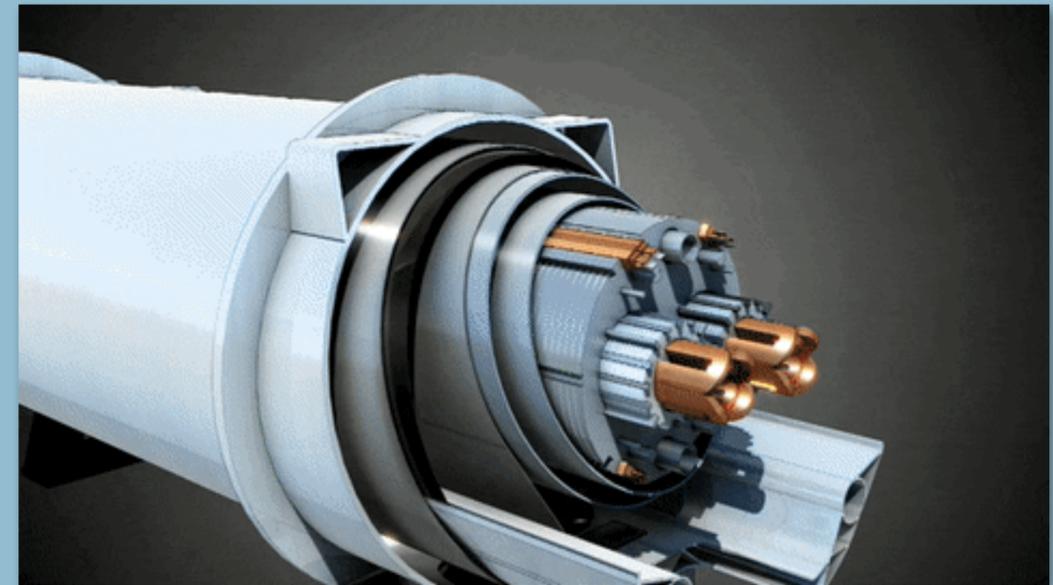


Im Inneren des LHC Strahlrohrs

Wo ist es kälter?

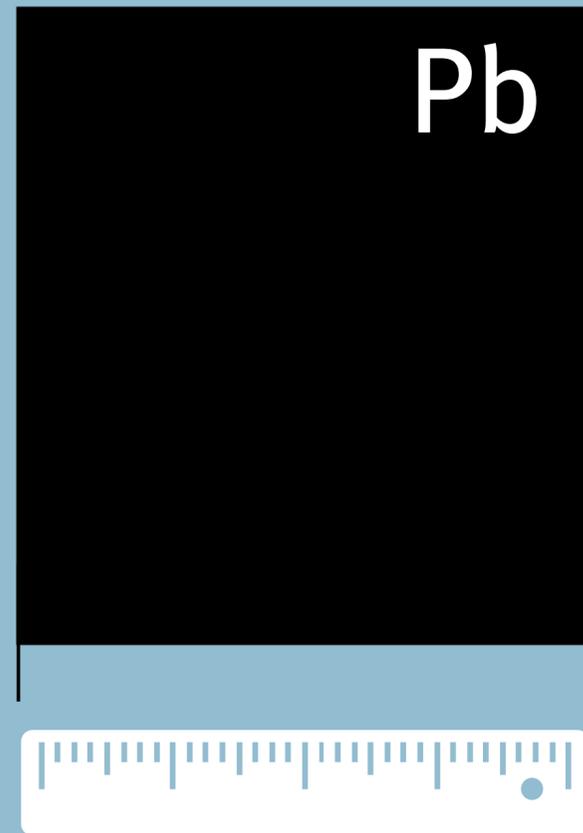


-160°C

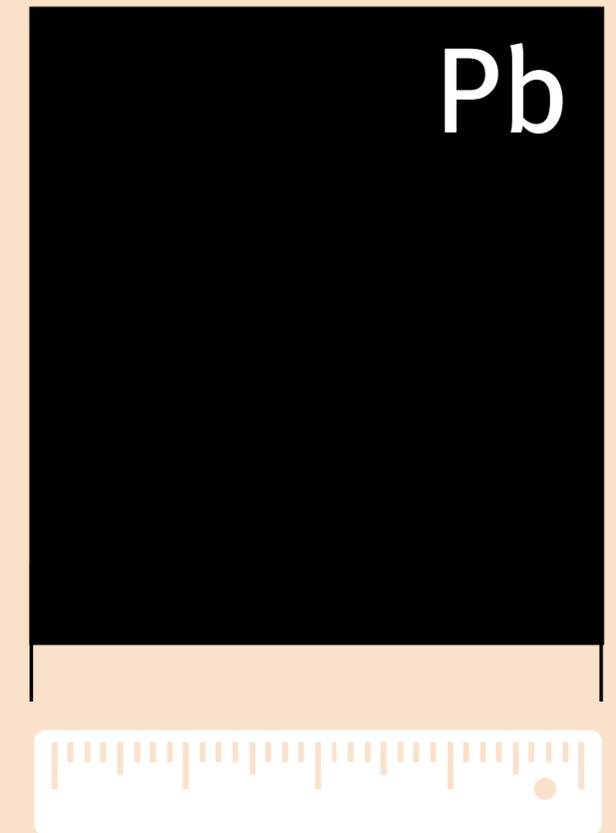


-271°C

Mittlere Reichweite eines solaren Neutrinos in Blei?

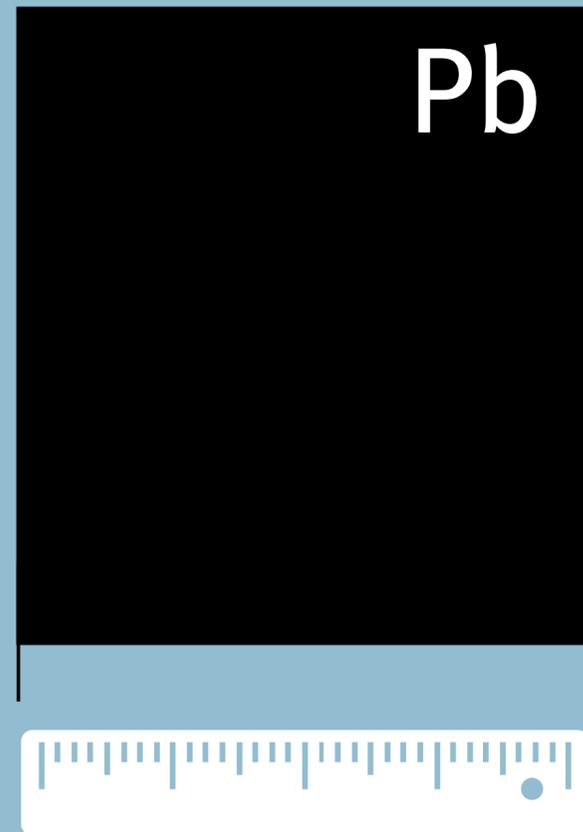


ca. 1 Lichtjahr



wenige Zentimeter

Mittlere Reichweite eines solaren Neutrinos in Blei?



ca. 1 Lichtjahr*

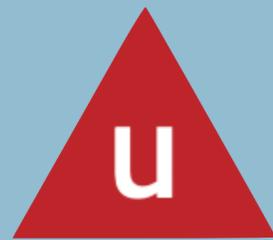
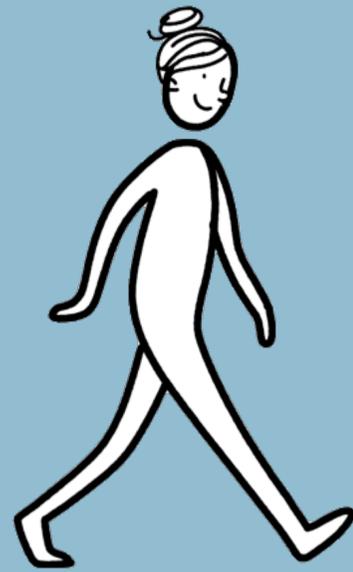
Neutrinos aus der Sonne haben typischerweise Energien von einigen **MeV**

$$\Rightarrow d_{Blei} = 1,5 \cdot 10^{16} m$$

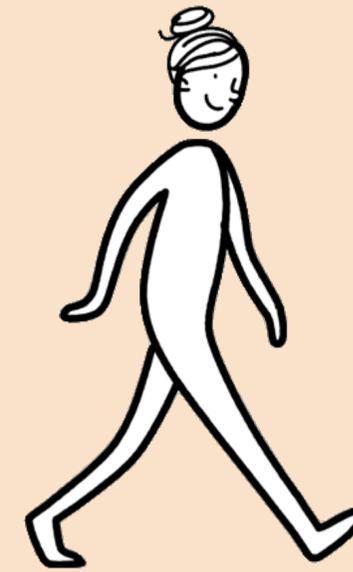
Zum Vergleich:

Ein Proton mit einigen **GeV** hat in Blei eine Reichweite von ca. **10 cm!**

Was ist das häufigste Elementarteilchen in Deinem Körper?

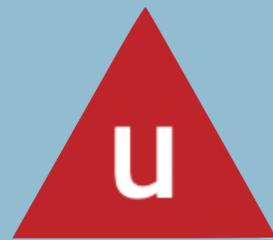
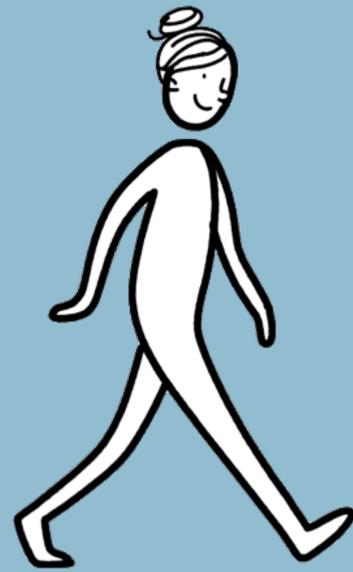


Up-Quarks

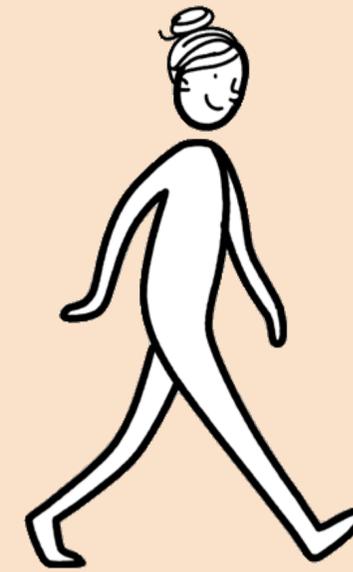


Elektronen

Was ist das häufigste Elementarteilchen
in Deinem Körper?

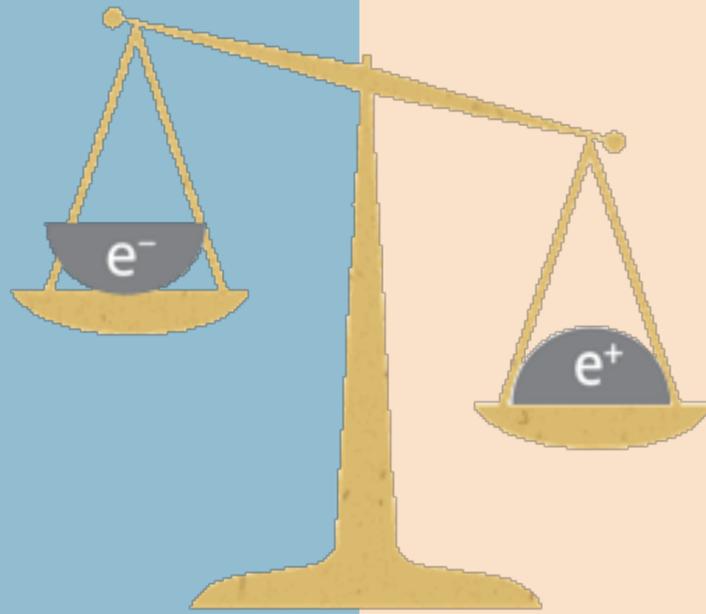


$$\approx 6,4 \cdot 10^{28}$$



$$\approx 2,3 \cdot 10^{28}$$

Was ist schwerer?

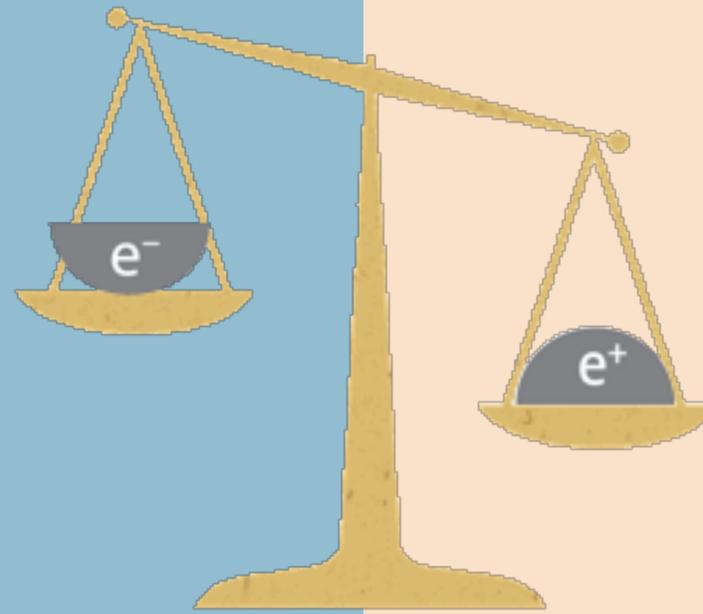


Elektron



Positron

Was ist schwerer?



$\sim 0,511 \text{ MeV}/c^2$



$\sim 0,511 \text{ MeV}/c^2$