

Lab workshop **Power of Air**

Investigate how balloon hovercraft allow for heavy things to be moved easily!

We are your guides for this workshop

Who we are



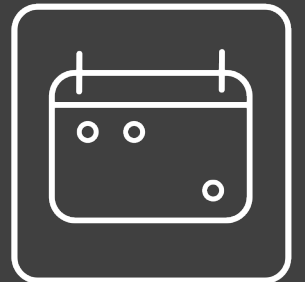
Science
memory



School



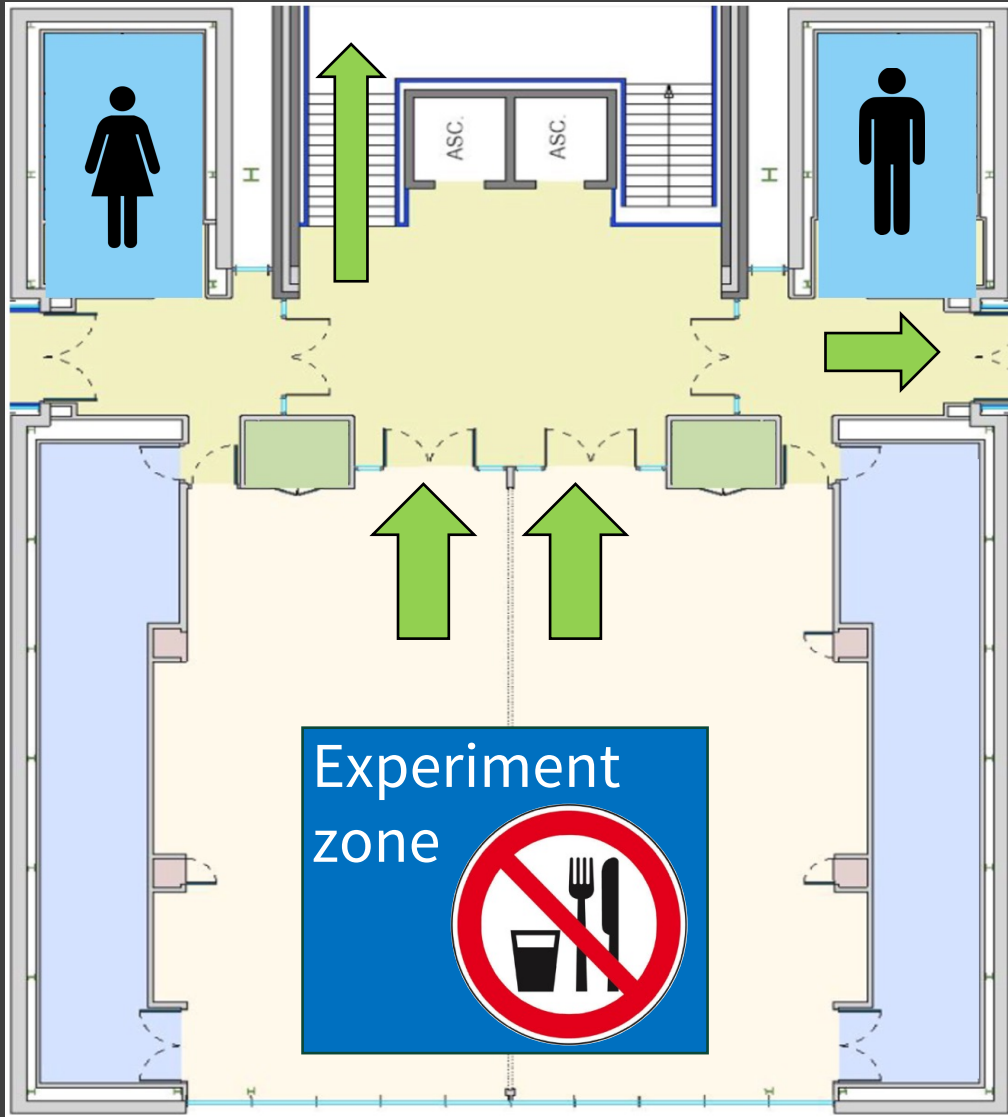
What I like
about CERN



My day
at CERN

Let's get
started!

Emergency exits and general rules



In case of an evacuation alarm:

- Leave your bags behind
- Follow guides to the nearest emergency exit and assembly point
- Wait for the CERN fire brigade

Toilets 

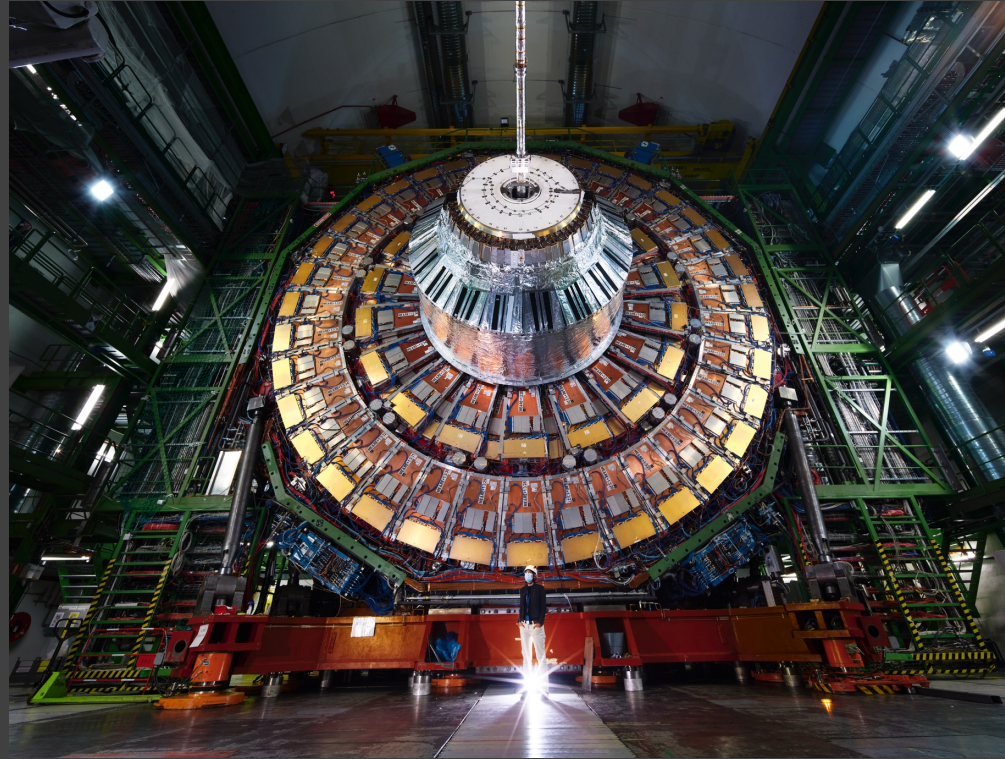
Eating & drinking

Pictures

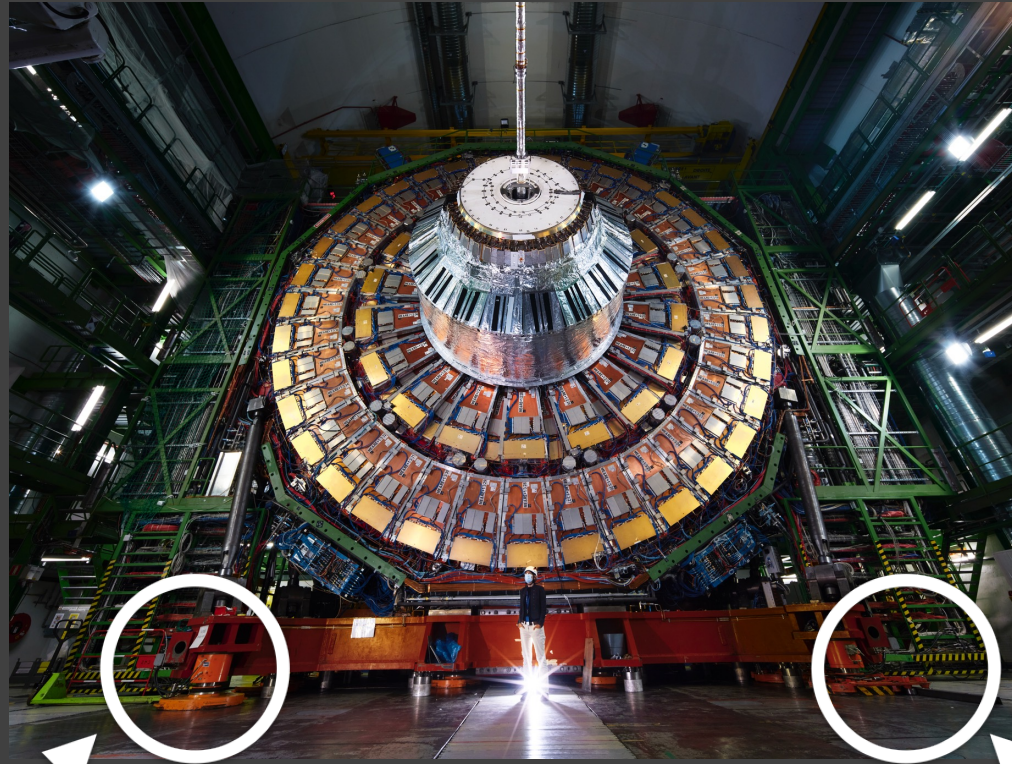


#CERNScienceGateway

How do you move a detector slice of 1000+ tonnes?

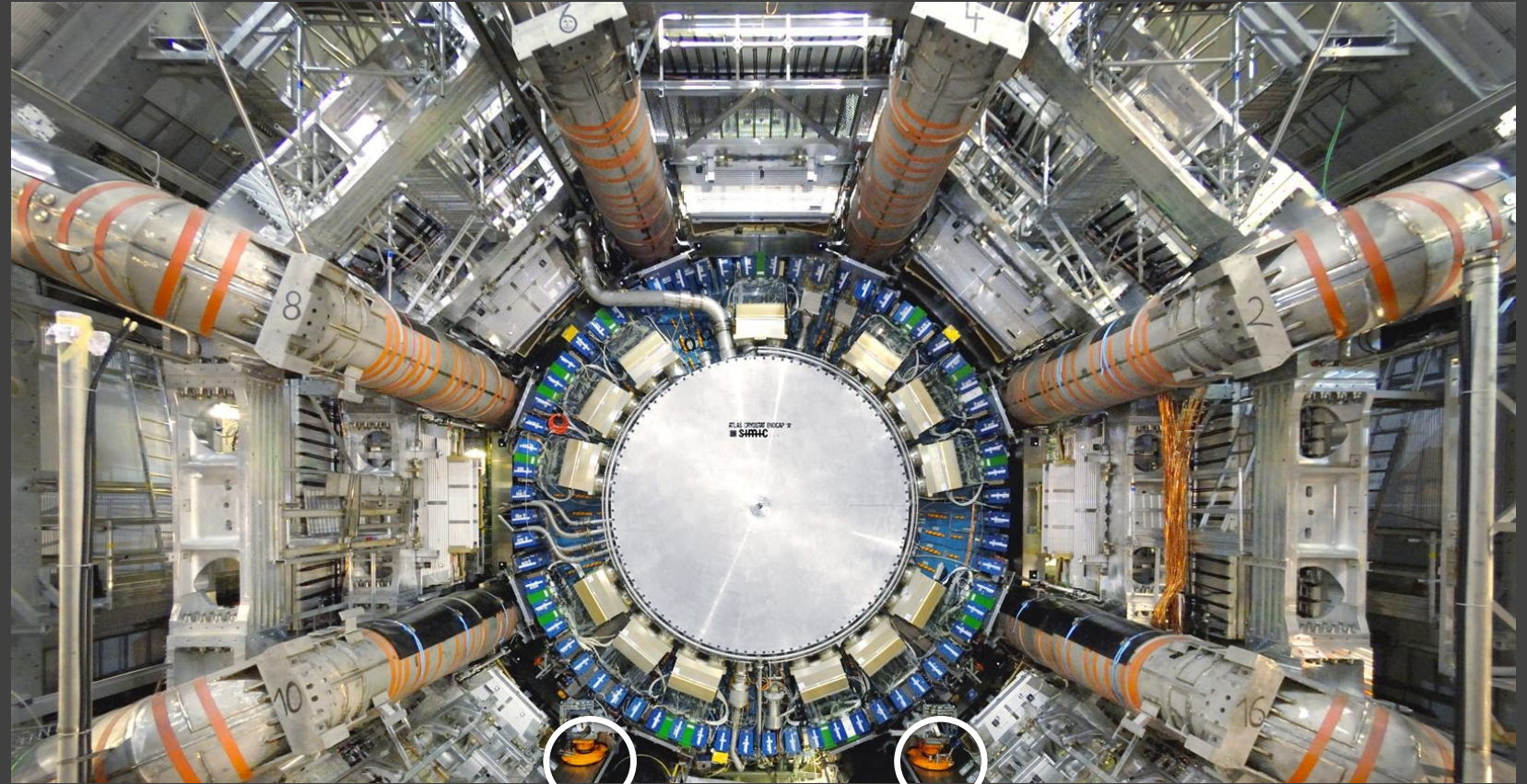


How do you move a detector slice of 1000+ tonnes?



Answer:
Using the power of air: **Air pads**

CERN Link: Heavy detectors at CERN are moved on **air pads (= hovercraft)**



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Video



<https://youtu.be/KNu-DFgJT-o>

Health & Safety



1 balloon
per person



Air pads
are individual

Experimental Phase 1

1. Explore different air pads.
2. Investigate different surfaces.

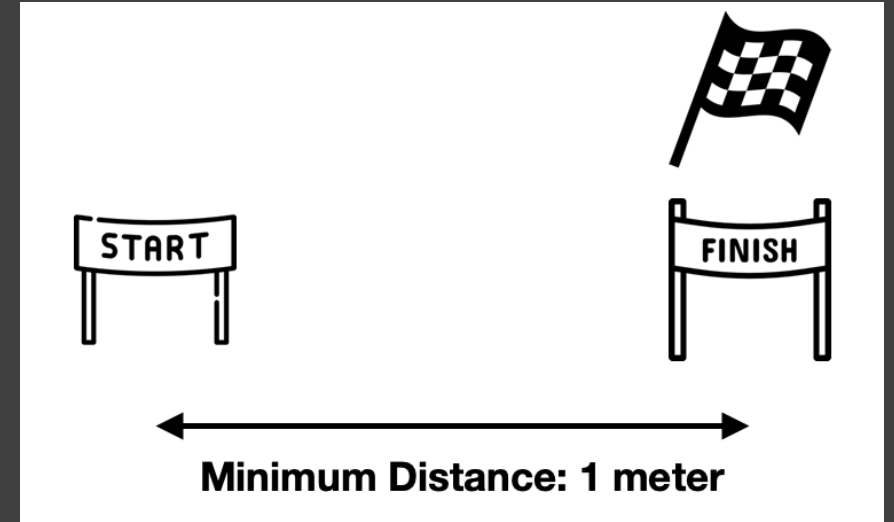
All done?

1. Be creative: create your own air pad game!



Experimental Phase 2

1. Put as many bricks on as you can.
2. Can you think of different designs?

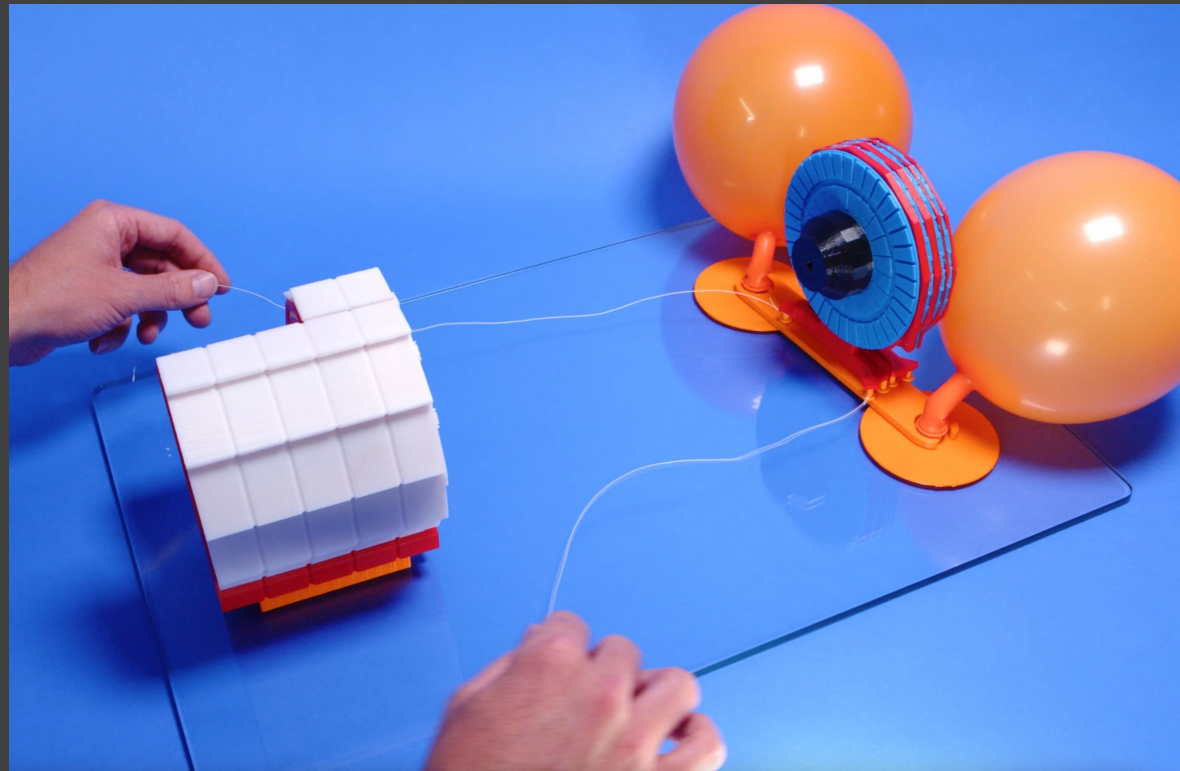


All done?

Team up with each other to build multi-air pad designs!

Experimental Phase 3

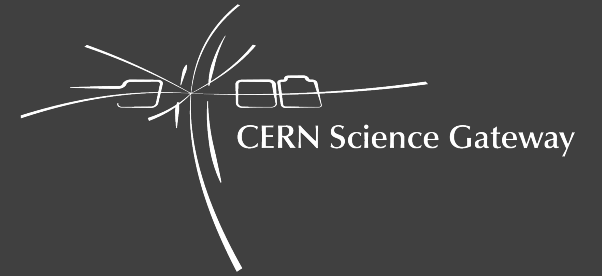
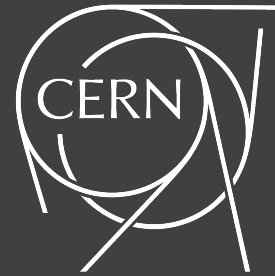
1. Design a system to close a 3D-printed CMS.
2. Mission: Close it from at least 30cm away.





DIY air pad at Science Gateway labs

Why not try to build your own at home?



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Thanks for exploring with us!

CMS DETECTOR

Total weight : 14,000 tonnes
Overall diameter : 15.0 m
Overall length : 28.7 m
Magnetic field : 3.8 T

STEEL RETURN YOKE
12,500 tonnes

SILICON TRACKERS
Pixel ($100 \times 150 \mu\text{m}$) $\sim 1\text{m}^2 \sim 66\text{M}$ channels
Microstrips ($80 \times 180 \mu\text{m}$) $\sim 200\text{m}^2 \sim 9.6\text{M}$ channels

SUPERCONDUCTING SOLENOID
Niobium titanium coil carrying $\sim 18,000\text{A}$

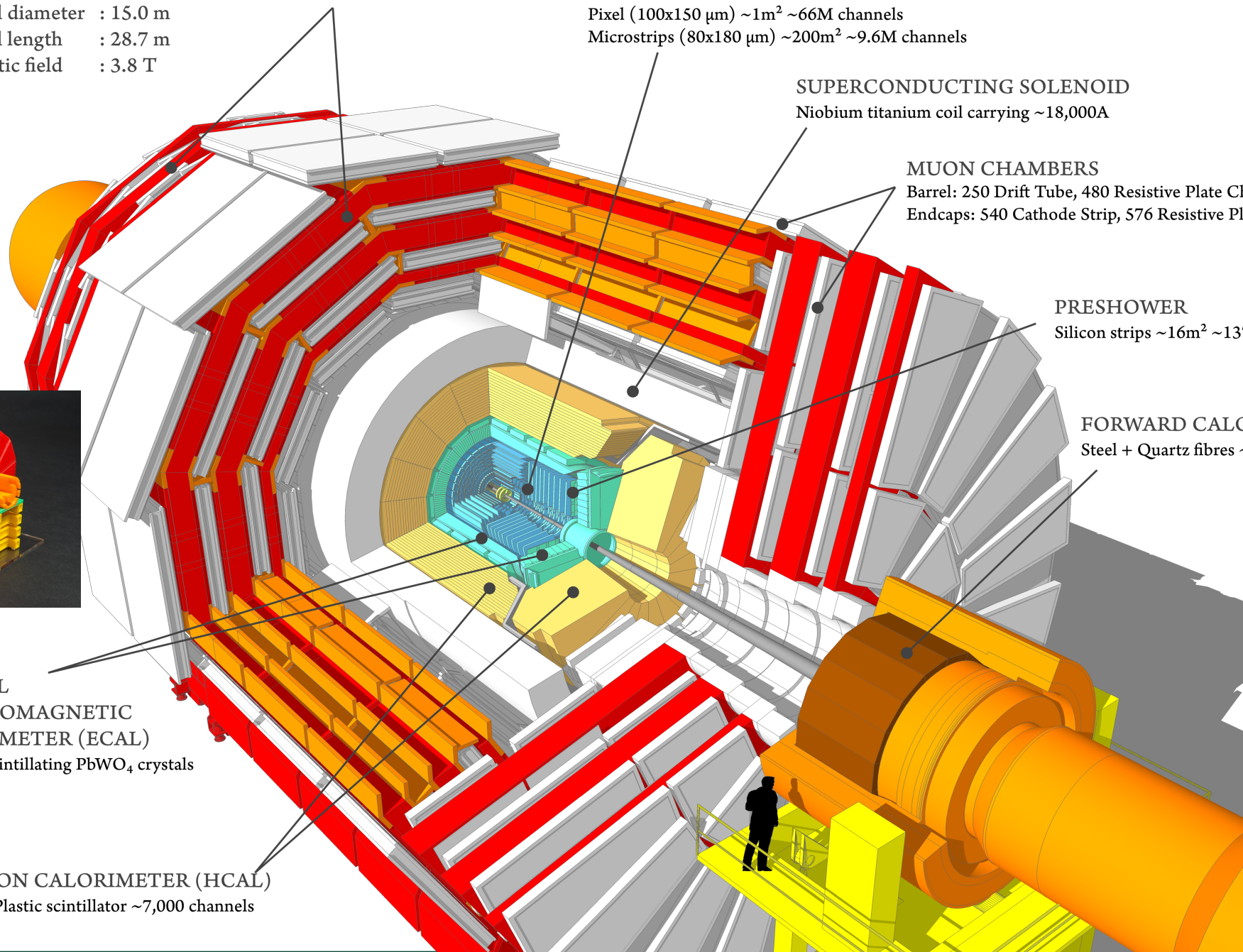
MUON CHAMBERS
Barrel: 250 Drift Tube, 480 Resistive Plate Chambers
Endcaps: 540 Cathode Strip, 576 Resistive Plate Chambers

PRESHOWER
Silicon strips $\sim 16\text{m}^2 \sim 137,000$ channels

FORWARD CALORIMETER
Steel + Quartz fibres $\sim 2,000$ Channels

CRYSTAL
ELECTROMAGNETIC
CALORIMETER (ECAL)
 $\sim 76,000$ scintillating PbWO_4 crystals

HADRON CALORIMETER (HCAL)
Brass + Plastic scintillator $\sim 7,000$ channels



Detector air pads



