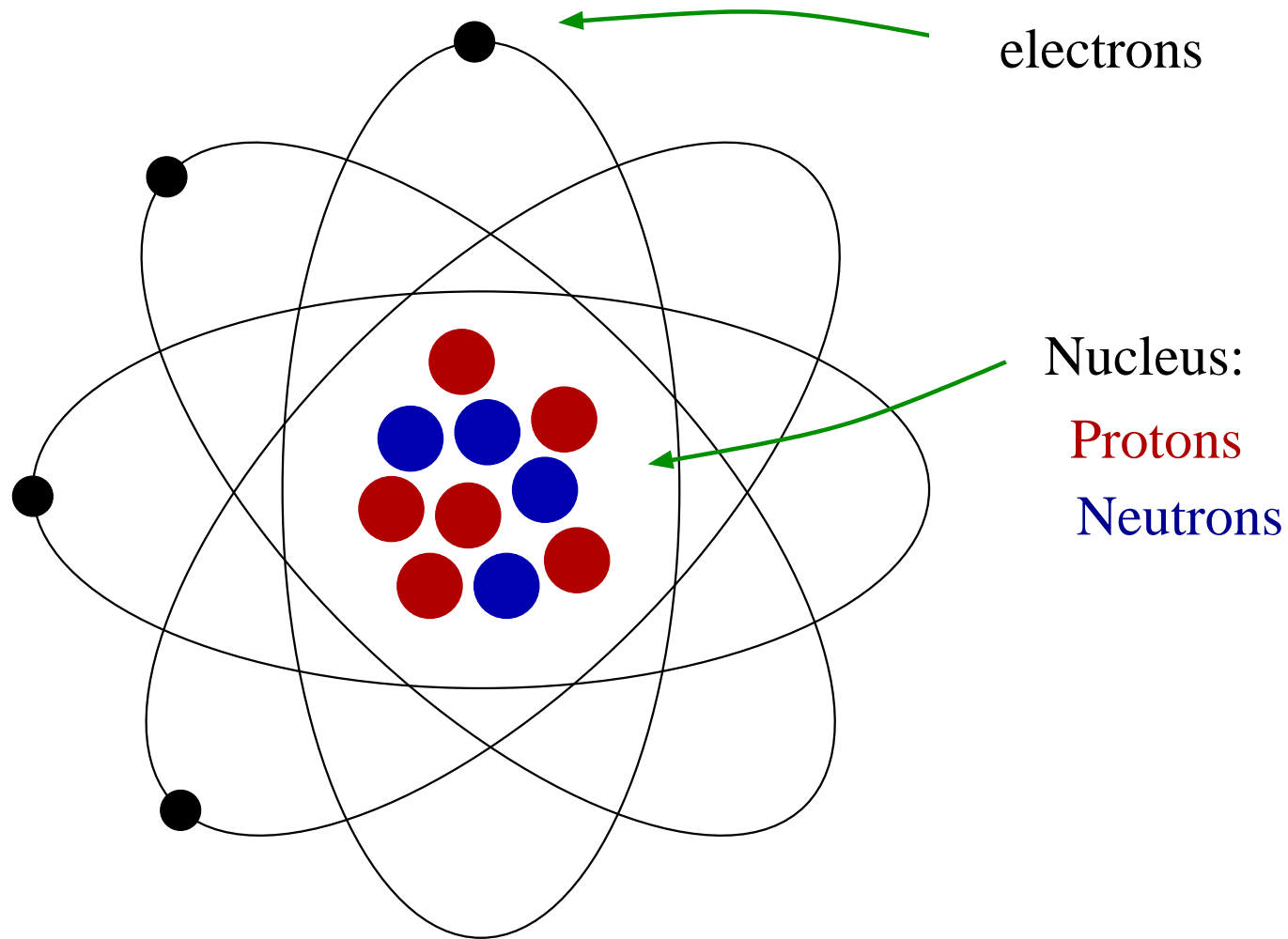


The large hadron collider (LHC) at CERN

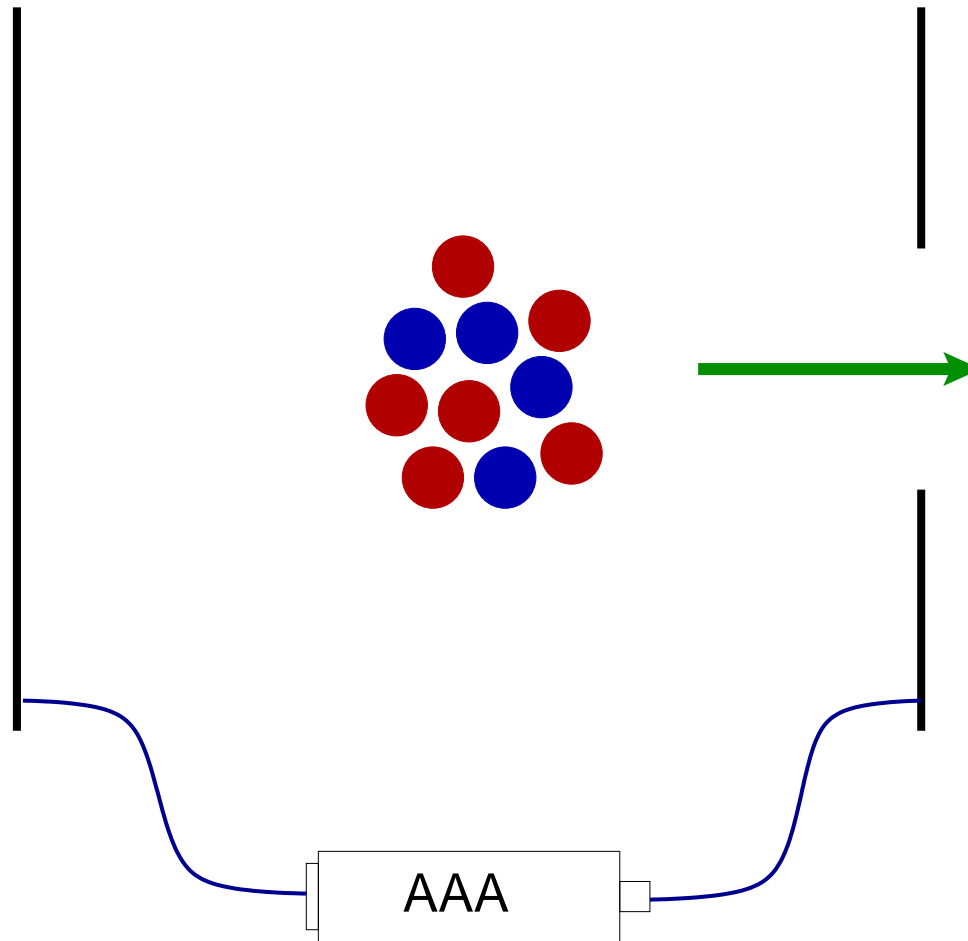


Stuff is made out of atoms



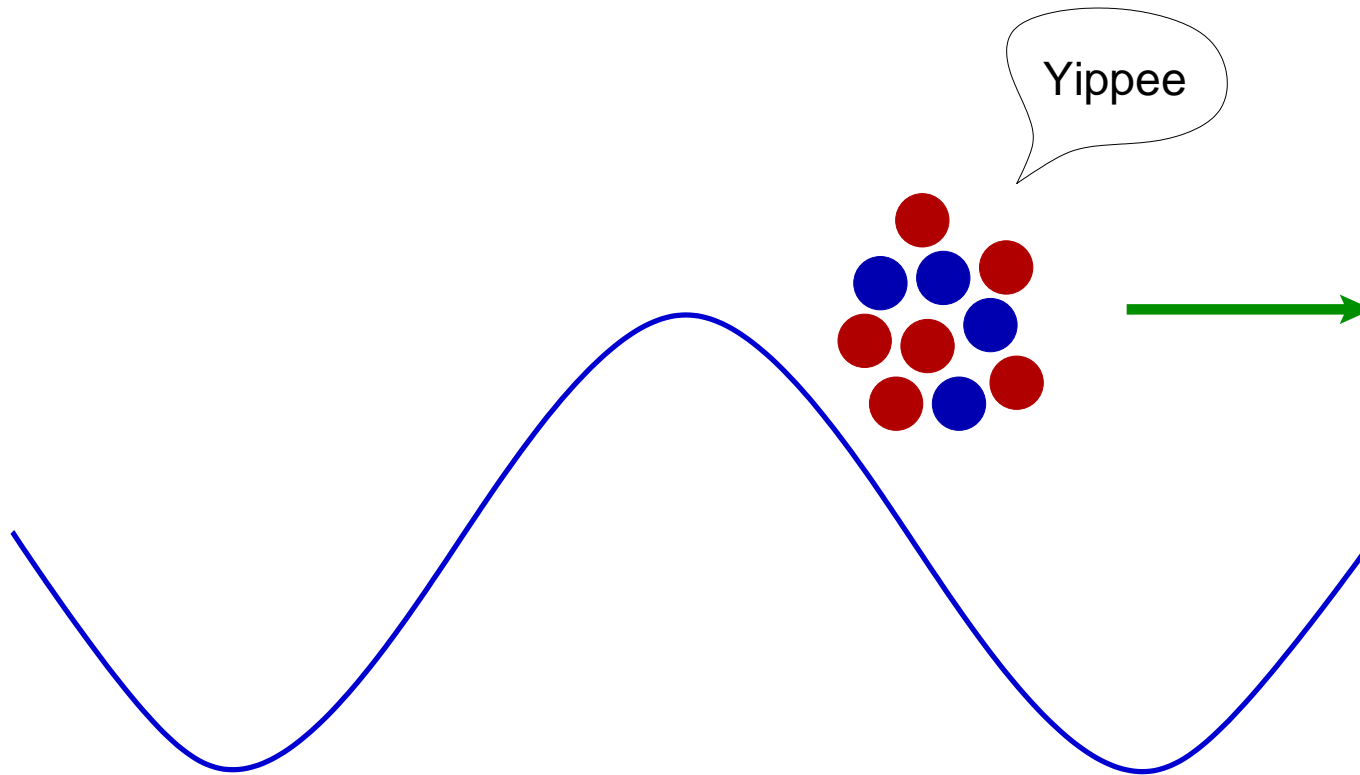
We can strip off the electrons.

The nucleus is charged and can be accelerated.



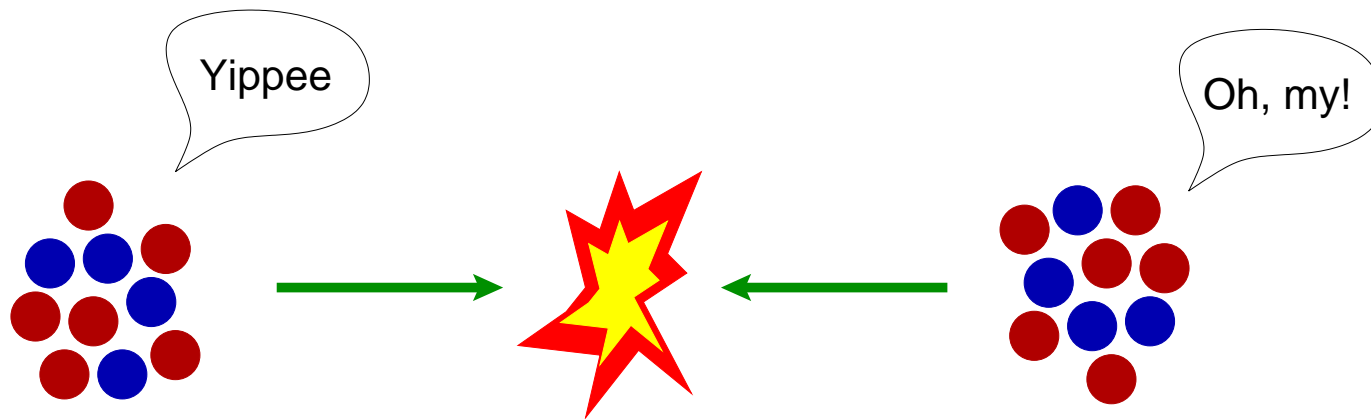
We call this energy 1 eV.

At the LHC the nucleus gets to ride a wave,
similar to the one that bounces around a microwave.



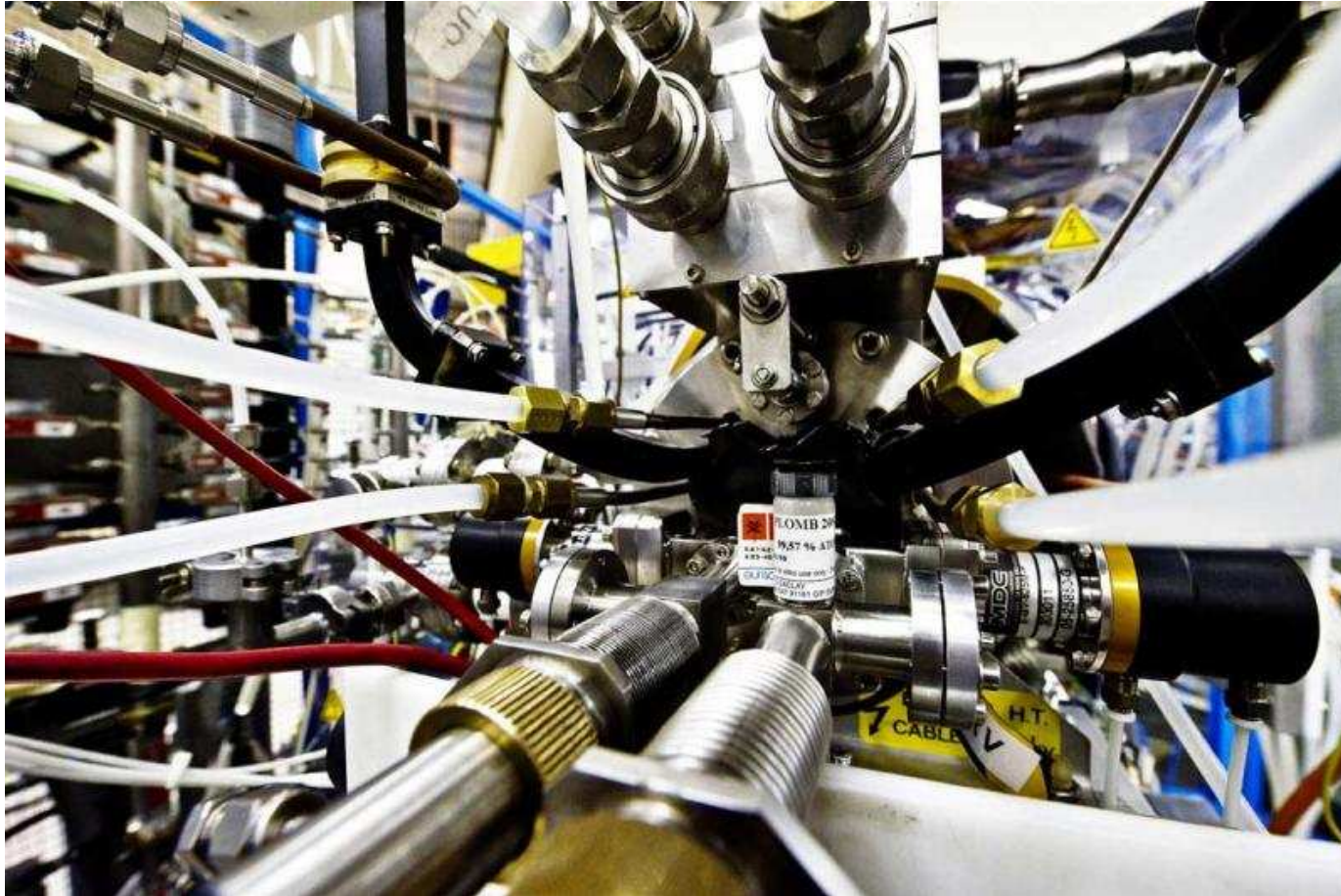
This way, we get to 70000000000000 eV.

Once they reach maximum speed,
we smash them into each other.

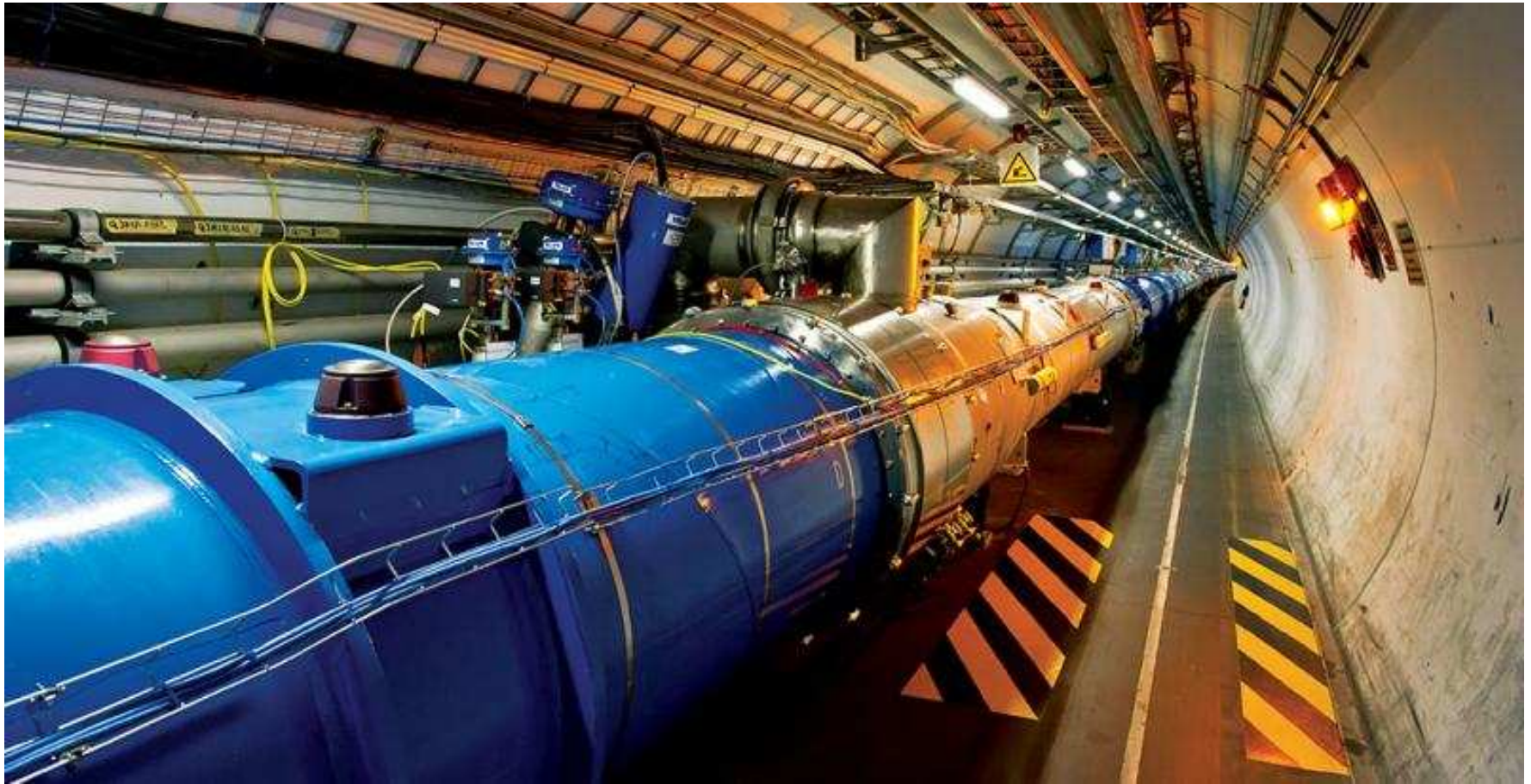


That produces a very small, but very hot fireball,
which contains new forms of matter.

The beginning of the journey



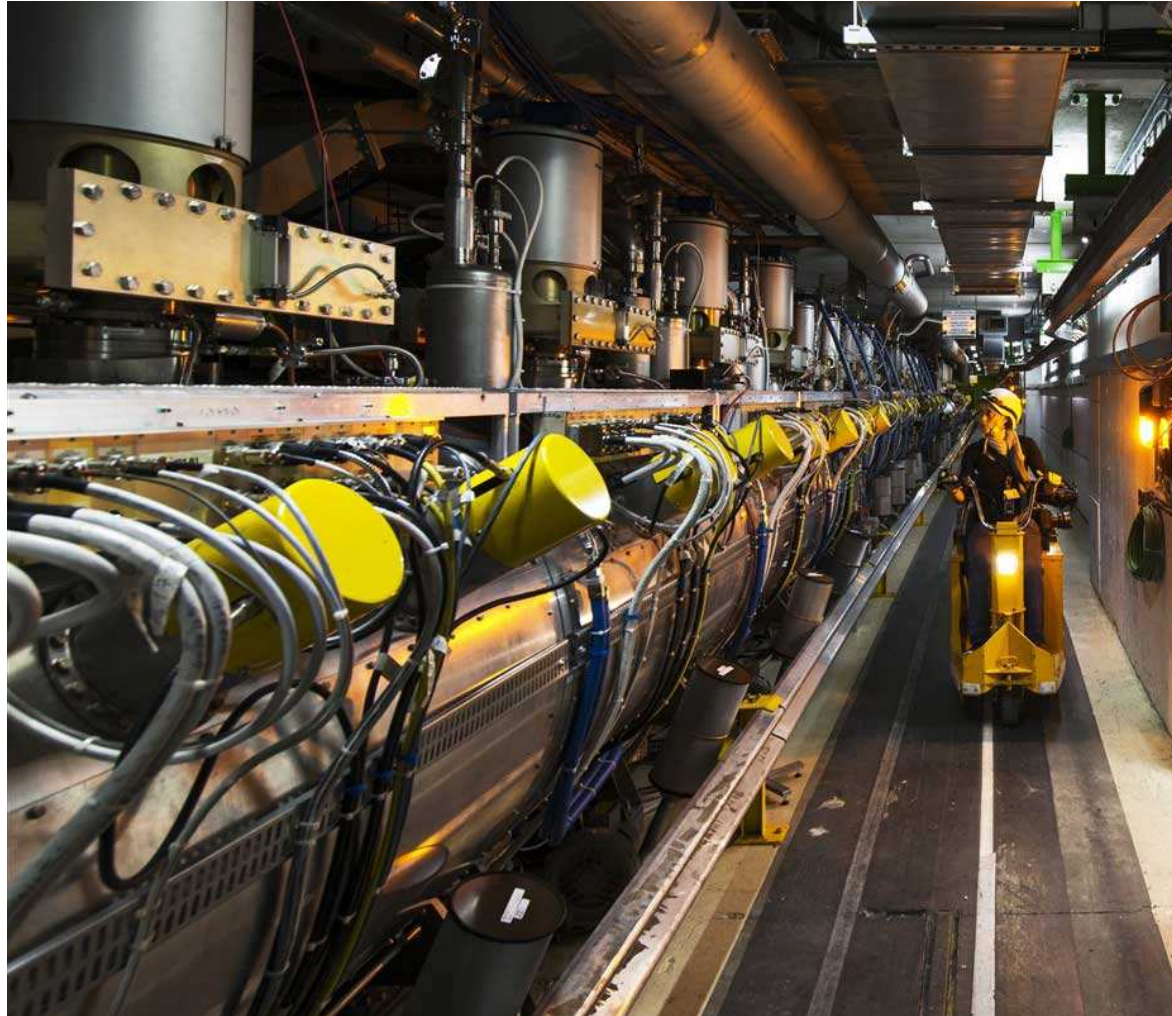
Inside the tunnel



The beam pipe



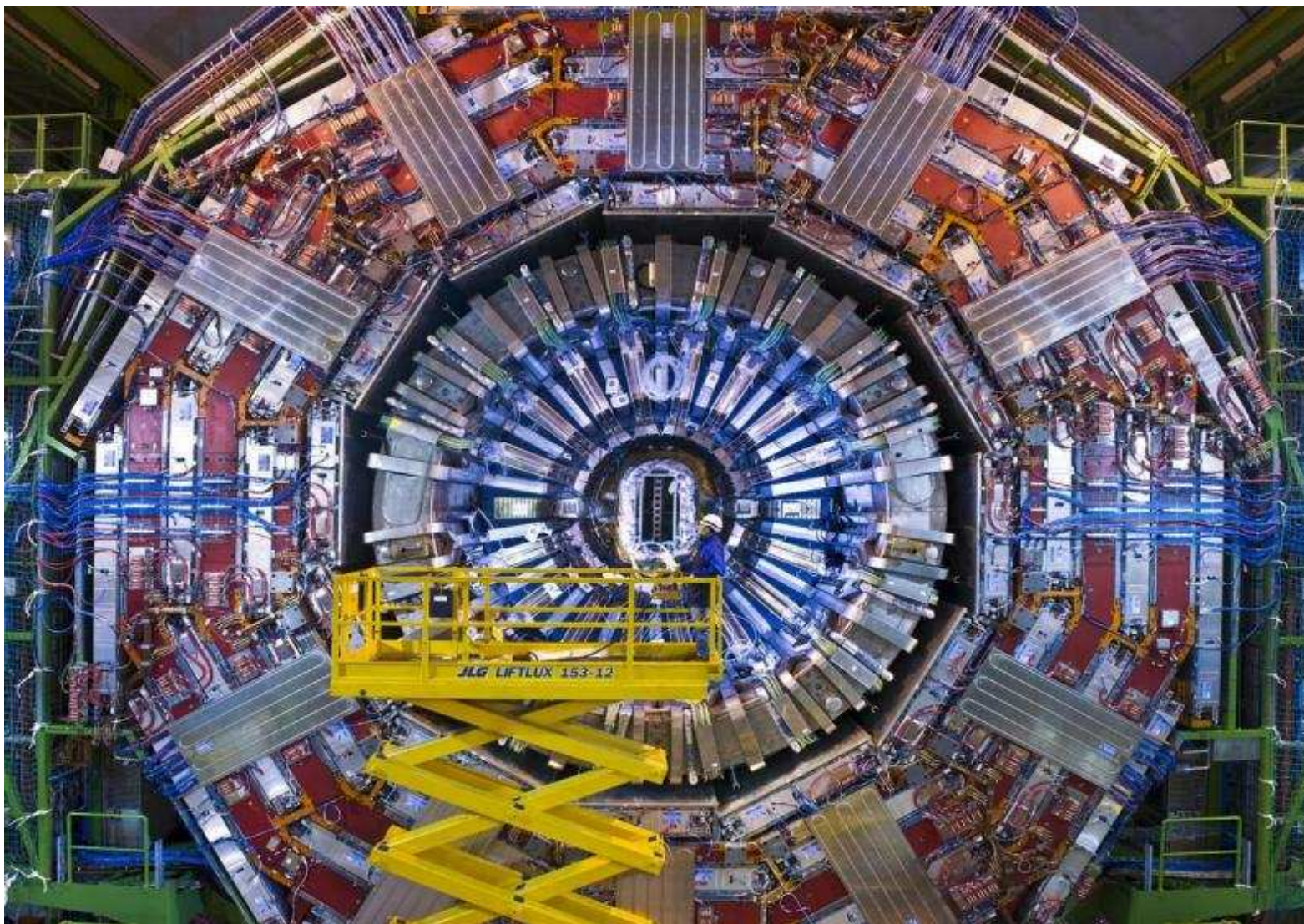
Accelerating cavities



Refrigerators



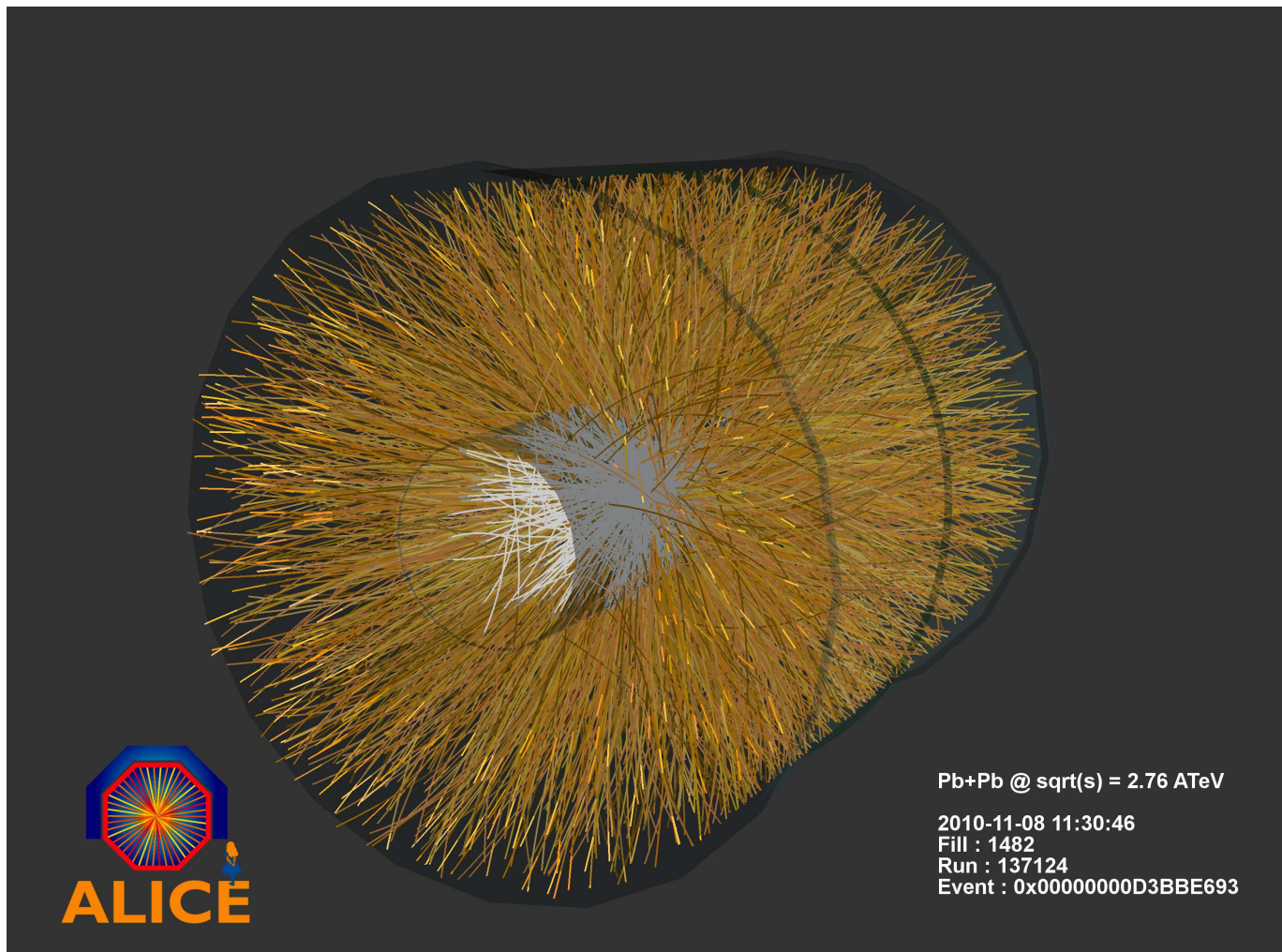
The CMS experiment



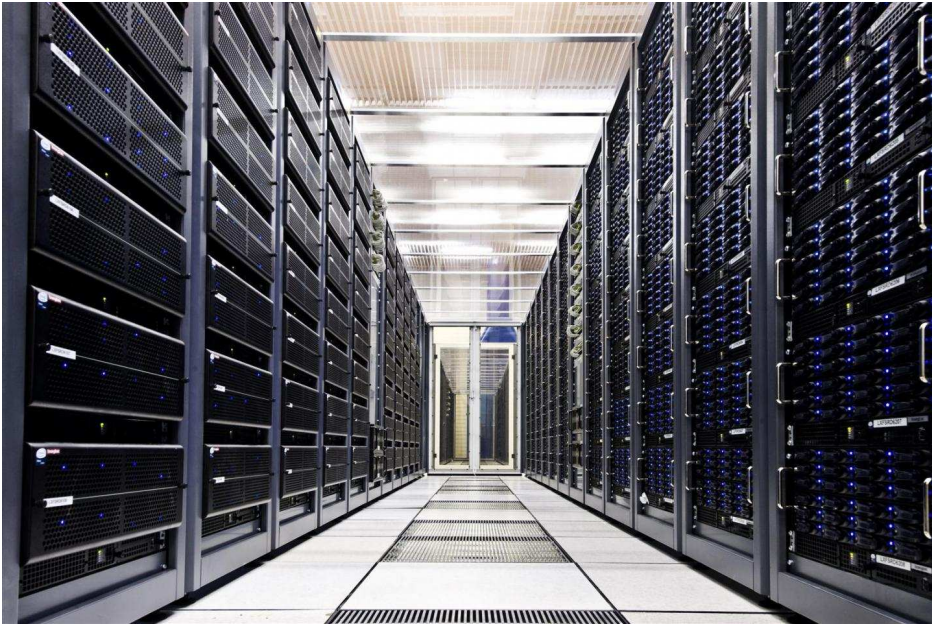
Another big detector, called ATLAS



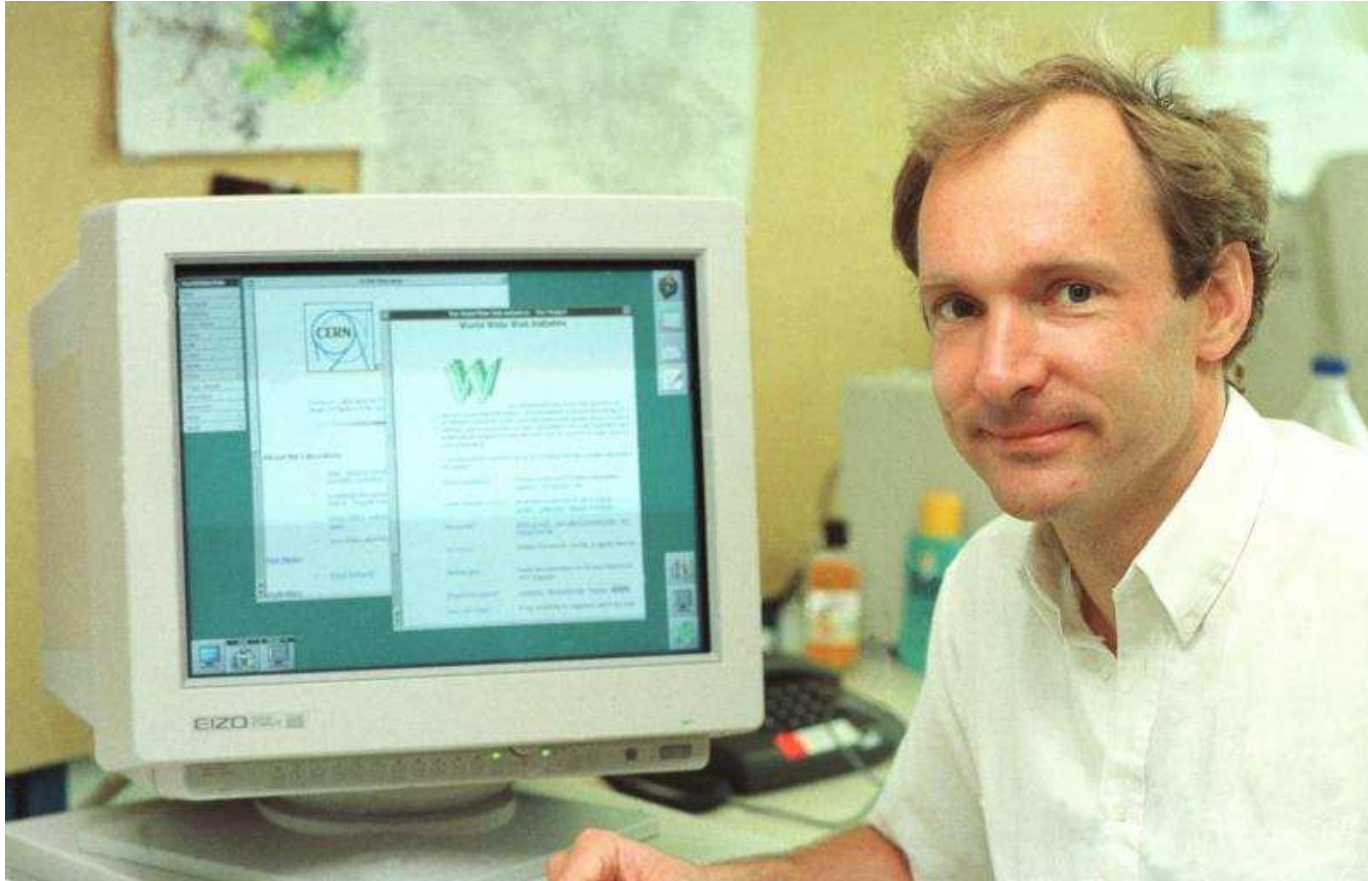
A snapshot of a collision



Computing



To share all the data, scientists at CERN invented a system that allowed you to “point and click”.



They called it “the (world wide) web”.

What do we find?

The fireball reaches $10^{12} = 1000000000000$ C. (The temperature at the surface of the sun is 6000 C, and in the center it is 10^7 C.)

At this temperature, nuclei boil and fall apart into protons and neutrons. The protons and neutrons also boil, and fall apart into “quarks”.

The universe was also born in a hot fire ball, called the “big bang”. The last time any place in the universe reached 10^{12} C, it was only $10^{-5} = 0.00001$ seconds old.