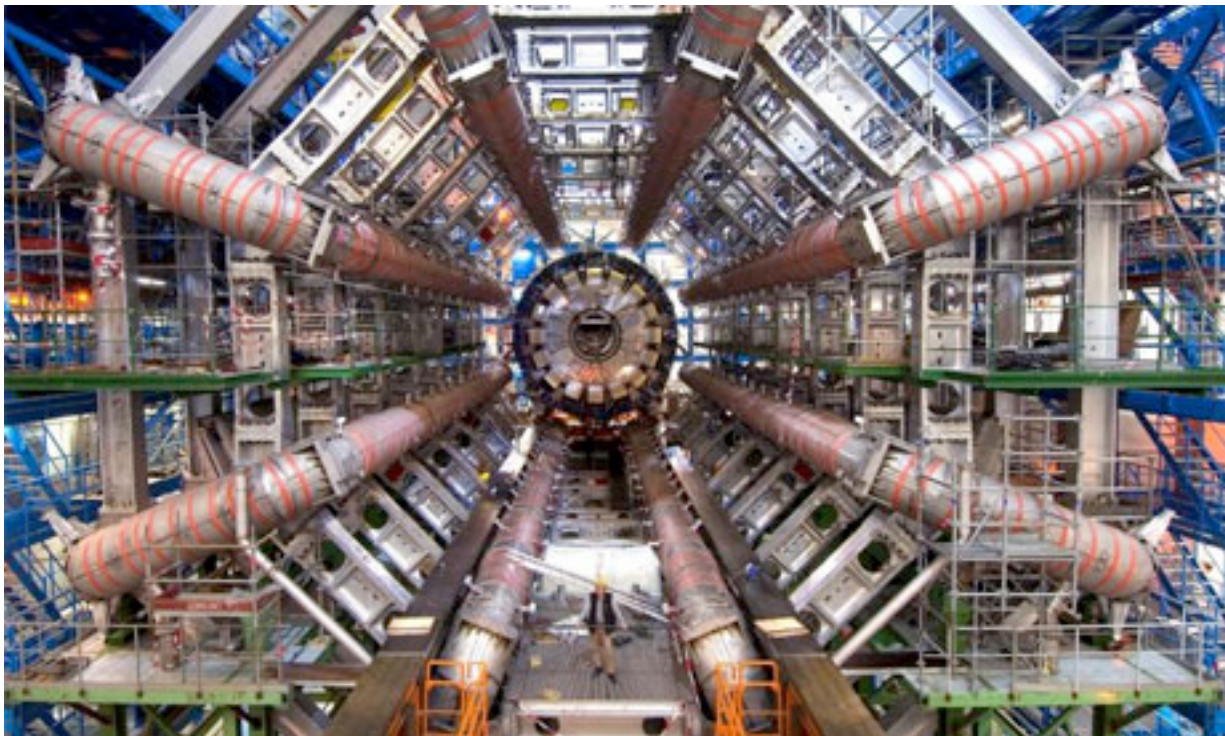


Big bang simulator achieves first proton collisions

- [Helen Pidd](#)
- [The Guardian](#) Tuesday 24 November 2009



View from the central axis of the LHC (Large Hadron Collider) tunnel of the ATLAS underground facility with the eight toroids surrounding the calorimeter

Scientists rejoiced last night when they managed to smash proton beams together for the first time in a £6bn giant machine designed to reveal clues about the origins of the universe.

Physicists at the Large Hadron Collider at [Cern](#), the nuclear research organisation near Geneva, hope their experiments can recreate conditions moments after the big bang. The machine, which occupies an almost 17 mile-long tunnel 100 metres beneath the French-Swiss border, achieved the collisions by sending two groups of sub-atomic particles around in opposite directions at the same time.

Collisions were recorded in all four of the main detectors during "experiments" in rooms the size of cathedrals.

"It's a great achievement to have come this far in so short a time," said Cern's director general, Rolf-Dieter Heuer.

Researchers waited eight years for the machine to be built, only to see it partially explode shortly after being switched on in September last year. Repairs and a new safety system cost an estimated £24m.

Earlier this month, work on the machine was again interrupted when a short circuit took out an electrical substation. The incident was blamed on a piece of bread dropped by a passing bird.

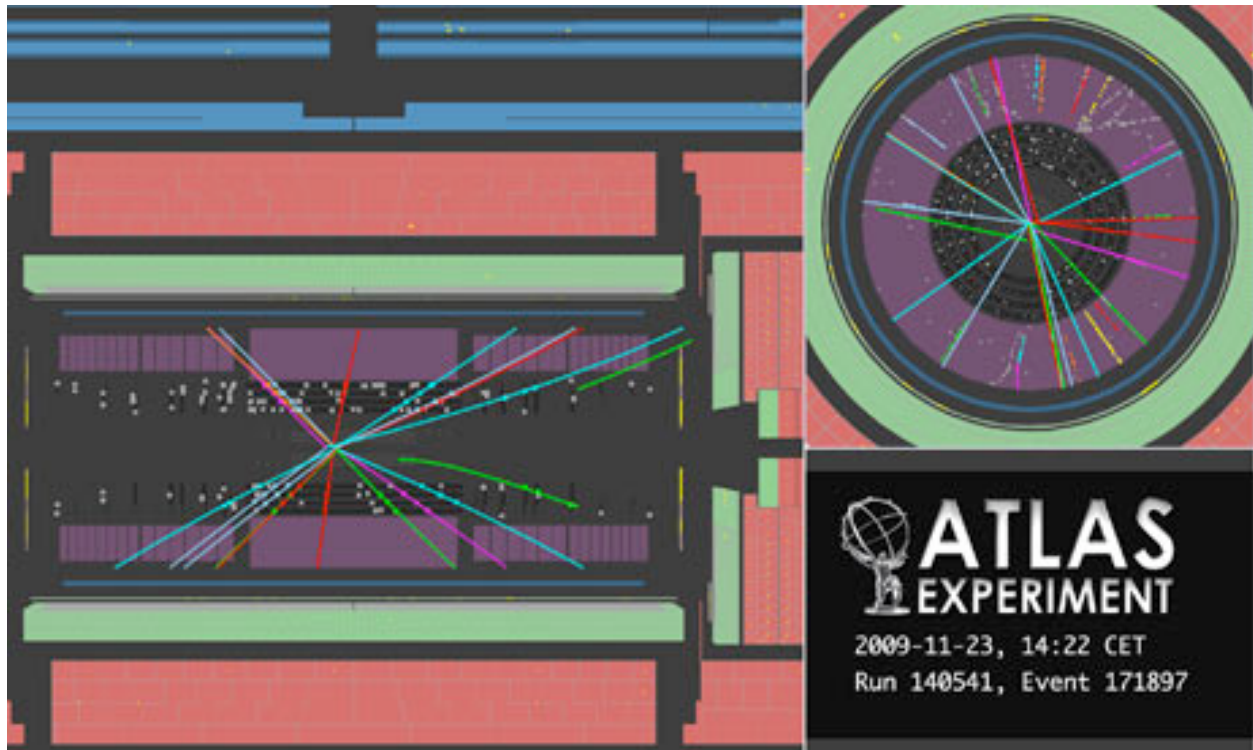
"This is great news, the start of a fantastic era of [physics](#) and, hopefully, discoveries after 20 years' work by the international community to build a machine and detectors of unprecedented complexity and performance," said Fabiola Gianotti, who represents the Atlas [particle physics](#) experiment at Cern.

The key aim of the project is to try to discover how the universe took shape, after the big bang 13.7bn years ago spilled out energy and matter at vast speeds that eventually became stars – including our sun – planets and then life itself.

The scientists plan to increase the beam intensity and accelerate the particles further. They hope the collider will help them see and understand suspected phenomena such as dark matter, antimatter and supersymmetry.

First image of particle collisions at Cern's £6bn atom smasher

The Large Hadron Collider has started crashing particles together, albeit at low energies. Here is the first snapshot taken by one of the machine's giant detectors



Two protons collide inside the giant Atlas detector at Cern's Large Hadron Collider near Geneva. The image was recorded on 23rd November 2009 and shows the first low energy event recorded by the detector. Photograph: Cern

After 14 months of repairs, [Cern engineers have got the Large Hadron Collider to smash particles together](#) far sooner than anyone dared hope.

For the time being the collisions are low energy, around 450 billion electronvolts per beam, which is around half the energy of what remains, for now, the world's most powerful particle collider: the Tevatron at Fermilab on the outskirts of Chicago.

This is the first event spotted by LHC's Atlas detector, picked up yesterday afternoon when the two counter-rotating beams of protons were steered into a head-on collision.

The lefthand image shows the detector from the side on, while the circular image on the right shows the collision as seen down the beampipe axis of the detector. The coloured streaks coming out from the centre of the image are mostly caused by pairs of quarks called pions. In each colliding proton there are three quarks.

Scientists on Atlas say the detector is working beautifully. For all of the researchers at the lab, this is the beginning of a wonderful new journey. Fingers crossed they'll find something that the current theory of particles and forces, aka the Standard Model, can't explain.

[For Cern's images of the grand start-up go here.](#)