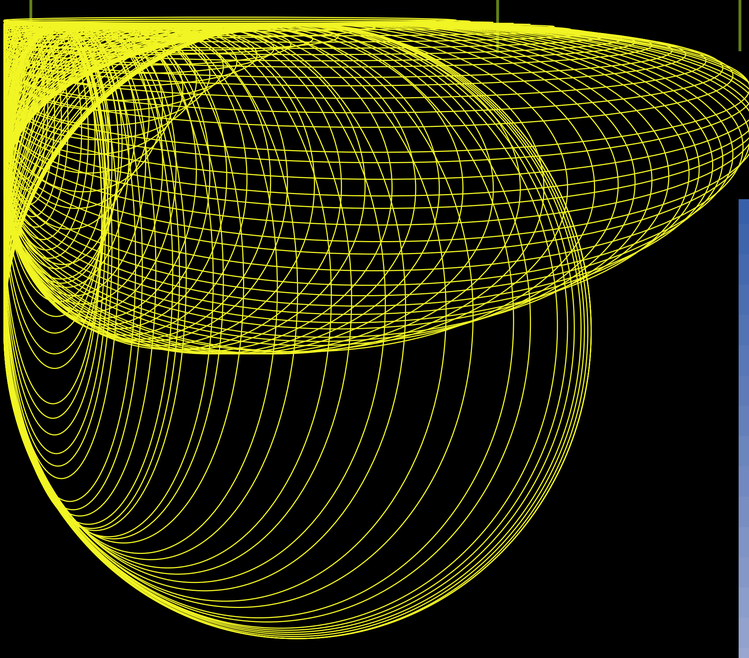
CERN - unlocking the mysteries of the Universe



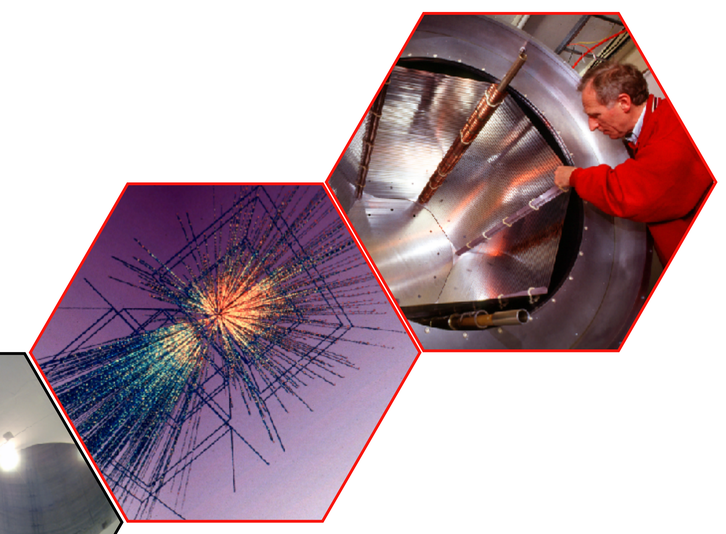
Towards a new frontier

The LHC will bring us into uncharted territory.
Nobody knows what new phenomena are waiting to be discoveredÉ

Back to the Big Bang

Today's Universe is cold, with the fundamental particles of matter arranged in an orderly fashion. Particles called quarks are bound together by gluons to make protons and neutrons, which in turn form atomic nuclei. Electrons orbit the nuclei to form atoms, and atoms are in turn the building blocks for complex objects like people and planets. But things have not always been that way. The Universe was born in an incredibly hot Big Bang, and the quarks and gluons would have been free for a fraction of a second in a form of quark-gluon plasma. An experimental programme at CERN's SPS took the first steps on the road to recreating matter in this extreme form in the 1990s, and the ALICE experiment will resume the study at the LHC in 2007.

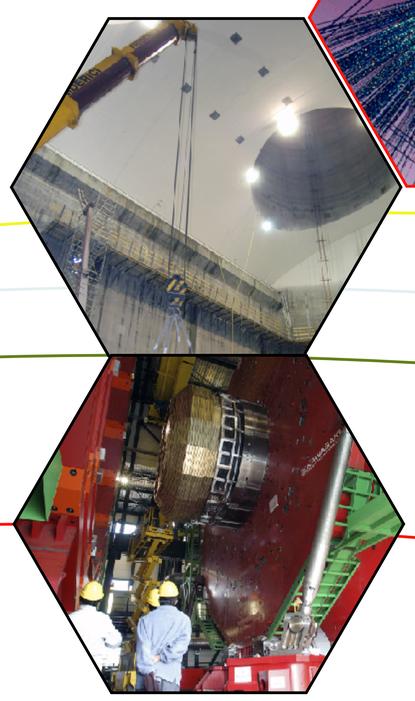
A prototype field cage for the ALICE experiment's Time Projection Chamber. The ALICE experiment is being designed to study the properties of matter as it would have been in the first fraction of a second after the Big Bang.



The dark side of the Universe

Science has taken great strides towards understanding what the visible Universe around us is made of and why it behaves the way it does. But the visible Universe accounts for less than 10% of what we know must be out there. The Universe is dominated by unknown kinds of matter and energy. New particles called supersymmetric particles could be the origin of this 'dark matter'. Their existence would also solve some theoretical problems in explaining high-energy particle interactions. If supersymmetric particles exist, experiments at the LHC should discover them.

This enormous cavern will house the ATLAS experiment for the LHC.



A dense forest of tracks emerges from the collision of a lead nucleus with a target in the NA49 experiment. In the 1990s, NA49 was one of several experiments using beams at the SPS to search for quark-gluon plasma.

Admiring the brass structure of a CMS endcap calorimeter. This device will measure the energies of particles emerging from collisions in the LHC.