

# Particle Physics

*the story so far*

## The smallest particles

Particle physics is the study of the smallest particles of matter in the universe (called quarks and leptons) and of the forces between them. It is carried out using huge machines that accelerate particles to close to the speed of light before smashing them together. By studying the debris from large numbers of such collisions physicists can learn about the particles and forces.

These same forces govern the behaviour of everything in the universe from the earliest times in the Big Bang. Thus there are strong links between particle physics and cosmology, currently two of the most fundamental and exciting areas of research in physics.

## Particle cosmology

Cosmology is the study of the origin of the universe. Particle cosmologists understand the development of the very early universe using knowledge gained from the collisions observed at particle accelerators.

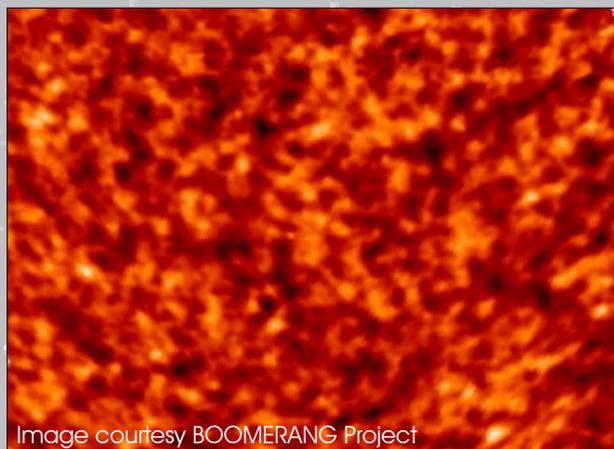
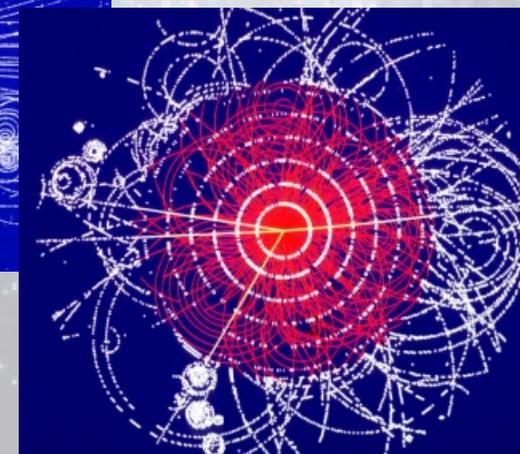
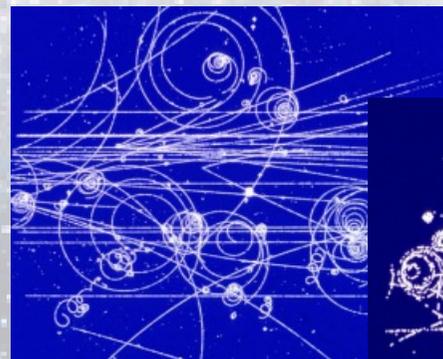


Image courtesy BOOMERANG Project

The distant Universe as it makes its transition from a glowing 2700 deg C plasma to a perfectly transparent gas, approximately 14 billion years ago, a mere 300,000 years after the Big Bang.

## Collisions at particle accelerators

From an event recorded by a bubble chamber in 1970 to a simulated decay of a Higgs boson in the ATLAS detector.



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