

Higgs boson discovery at the LHC

Why is the Higgs boson important?

The 'Standard Model' is the theory that successfully describes all the known fundamental particles, which make up everything around us. However, it would incorrectly predict that all fundamental particles are massless, were it not for the presence of the Higgs boson. The existence of this particle was first postulated by Peter Higgs and others in 1964.

How do fundamental particles acquire a mass?

A 'Higgs field' permeates the entire Universe, like an invisible sea. Particles moving through it and interacting with it behave as if they have a mass.

This is similar to a film star walking through a crowd. People cluster around him, which changes the way he moves.



A large amount of energy, like that delivered by the LHC, can stimulate the production of a Higgs boson from the Higgs field.

This is similar to a rumour passing through a crowd, causing people to cluster together to hear it.



Discovery of the Higgs boson

CMS and ATLAS discovered the Higgs boson in July 2012, almost 50 years after its existence was first proposed!

The high energy protons (p) collided by the LHC occasionally produce a Higgs boson (H), which then almost immediately decays. Sometimes, it decays to a pair of Z bosons, each of which may decay to a pair of muons (μ), which ATLAS and CMS can detect. Other decays have also been seen.

