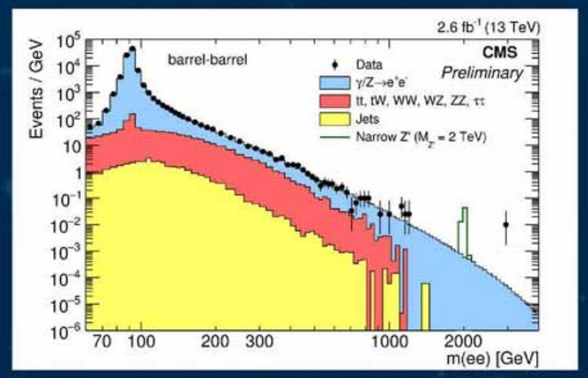
Physics with ATLAS & CMS

Search for the Z boson

The Z´ boson is a hypothetical particle, predicted in many exotic extensions of the Standard Model. It is a force carrying particle, like the Z boson, but much heavier.

If it exists, then the Z´ could decay to an electron + positron, which we would detect. A peak in their 'mass spectrum' (right) would announce its discovery!

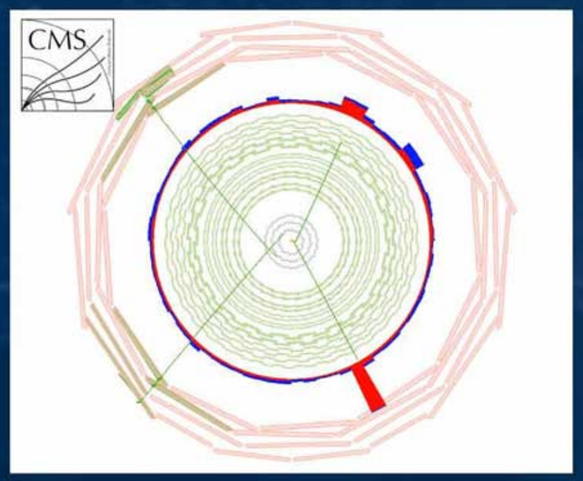


Search for long-lived exotic particles

Most of the exotic particles that the LHC is searching for (Z´, Higgs, black holes …) are predicted to decay almost immediately to other particles, which we observe in our detector.

A few, such as the mysterious 'dark matter' particle, may live forever.

We have searched for invisible particles that fly part way through our detector, before decaying to electrons or muons (right).



Quantum black holes

A massive star can collapse to form a black hole, a region from which gravity prevents anything, including light escaping.

Exotic theories that postulate the existence of extra spatial dimensions, predict that microscopic black holes might be produced at the LHC. If we detect them, it would hugely advance our understanding of gravity.