Higgs Boson tops journal Science's top 10 of 2012

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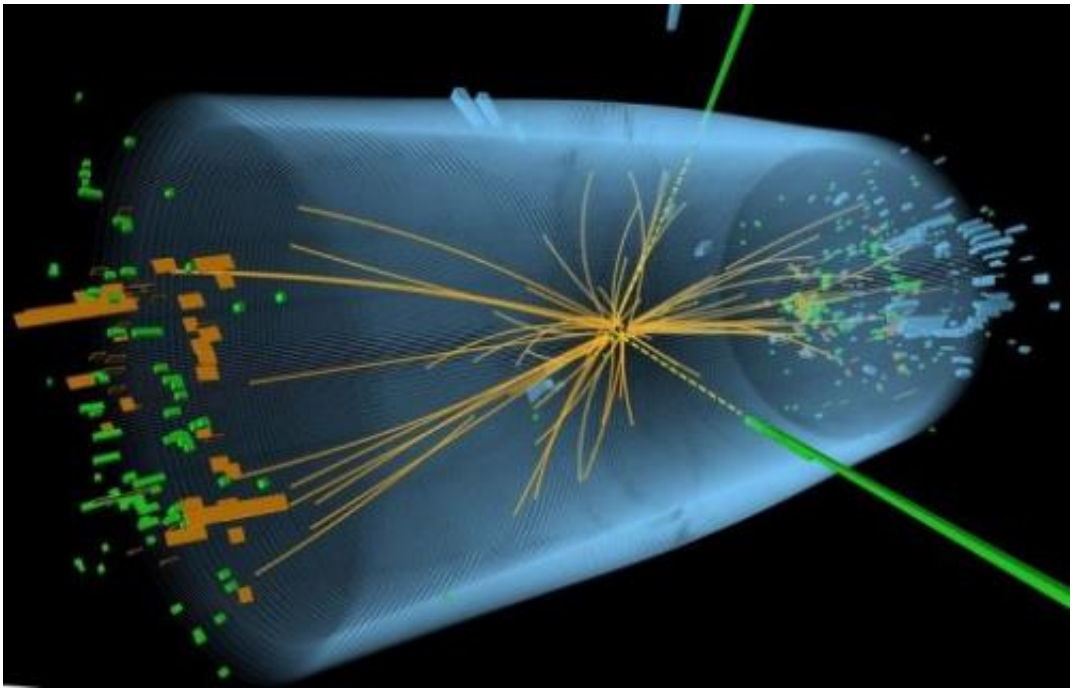

Graphic distributed on July 4, 2012 by the European Organization for Nuclear Research (CERN) shows a representation of traces of a proton-proton collision measured in the Compact Muon Solenoid (CMS) in the search for the Higgs Boson particle. The discovery of the Higgs Boson particle, leads a list of the top 10 scientific advances of 2012 released Thursday by the US journal Science.

The discovery of the Higgs Boson, an invisible particle that explains the mystery of mass, leads a list of the top 10 scientific advances of 2012 released Thursday by the US journal *Science*.

Without the Higgs Boson, scientists believe, we and all the other joined-up atoms in the Universe would not exist.

The God Particle is named after 83-year-old Peter Higgs, a shy, soft-spoken Briton who in 1964 published the conceptual groundwork for the particle. Belgian physicist Francois Englert, 79, separately contributed to the theory.

The other major advances, according to *Science*, are:

— Scientists in Germany used a new technique to sequence the complete genome of an enigmatic group of humans called the Denisovans, based on a tiny sample teased from a finger bone some 80,000 years old found in a cave in Siberia. Nothing was known about the Denisovans other than that they were contemporaries of the Neanderthals, another "cousin" species of modern humans.

— Japanese scientists created viable egg cells using embryonic stem cells from adult mice. The breakthrough raises the possibility that women who are unable to produce eggs naturally could have them created in a test tube from their own cells and then implanted in their body.

— NASA engineers landed the 3.3 ton Mars Curiosity rover on the Red Planet by using an innovative landing system that dangled the vehicle, with its wheels out, at the end of three cables. "The flawless landing reassured planners that NASA could someday land a second mission near an earlier rover to pick up samples the rover collected and return them to Earth," Science said.

— Use of an X-ray laser, which shines one billion times brighter than traditional synchroton sources, allowed scientists to determine the structure of a protein involved in the transmission of African sleeping sickness. "The advance demonstrated the potential of X-ray lasers to

decipher proteins that conventional X-ray sources cannot," Science said.

— A new tool let researchers modify or deactivate genes in test animals. This technology could be as effective, and even cheaper, than current gene-targeting techniques and could let researchers focus on specific roles for genes and mutations in healthy and sick people.

— Scientists confirmed the existence of Majorana fermions, particles that can act as their own antimatter and destroy themselves. Scientists believe that "qubits" made of Majorana fermions could be used to more efficiently store and process data than the bits currently used in digital computers.

— The ENCODE Project, which showed that 80 percent of the human genome is active and helps turn genes on and off. The new information could help scientists understand genetic risk factors for diseases.

— A brain-machine interface that allows paralyzed humans to move a mechanical arm with their minds and perform movements in three dimensions. The experimental technology is promising for patients paralyzed by strokes and spinal injuries.

— Researchers in China discovered the final unknown parameter of a model describing how sub-atomic particles known as neutrinos change as they travel at near-light speed. The results suggest that neutrino physics may someday help researchers explain why the universe contains so much matter and so little antimatter.

More information: www.sciencemag.org/site/special/btoy2012/