MASS = ENERGY: E = mc^2

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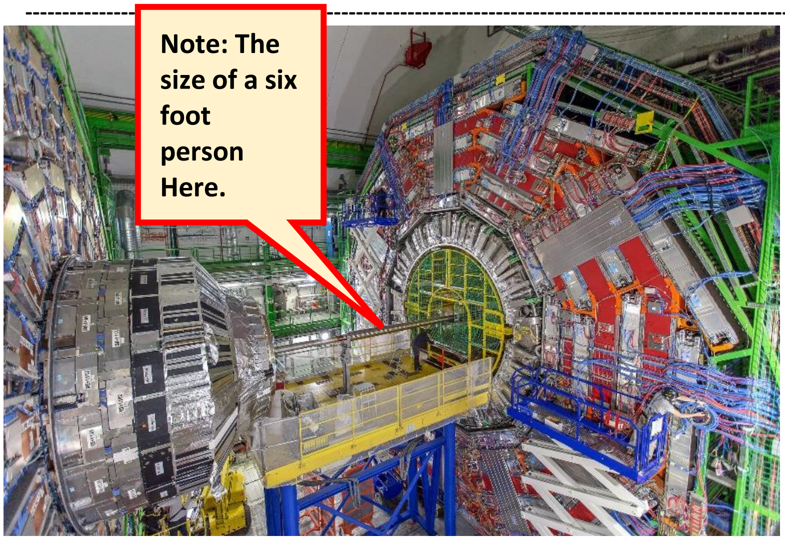

CERN hosts thousands of scientists, representing 22 member countries, all working to understand how the universe was created. CMS is one of seven detectors on[8] site.

INTRODUCTION: Goal here is to show mass of Higgs particle is similar to (as stated below) mass of iodine atom (from wiki….. 2.107 X 10^{-25} kg.). ev = electron volt = 1.602 X 10^{-19} Joules.

QUESTIONS: (a) Convert mass of Higgs Boson listed below (125 X 10^{9} ev) to Joules? (b) Find rest mass In kg. of Higgs Boson from E = m c^2 ?, (c) How well did mass computed with E = m c^2 for Higgs Boson compare with mass of iodine atom?

HINTS: c = speed of light = 3 X 10^{8} m./s.
ANSWERS: (a) 2 X 10^{8} J , (b) 2.22 X 10^{-25} kg., (c) Comparison is good within 5 %.
COMMENT: Volt = Work/charge, ev is the energy attained by electron (1.602 X 10^{-19} coul.) falling through 1 volt. Work = energy = q V.
= (1.602 X 10^{-19} coul.)(1 J/coul.) = 1.602 X 10^{-19} J.

Yearning for New Physics at CERN,in a Post-Higgs Way

Physicists monitoring the Large Hadron Collider are seeking clues to a theory that will answer deeper questions about the cosmos. But the silence from the frontier has been ominous. MEYRIN, Switzerland — The world's biggest and most expensive time machine is running again. Underneath the fields and shopping centers on the French-Swiss border outside Geneva, in the Large Hadron Collider, the **subatomic particles known as protons are zooming around a 17-mile electromagnetic racetrack and banging into one another at the speed of light, recreating conditions of the universe when it was only a trillionth of a second old.** Some 5,000 physicists are back at work here at CERN, the European Organization for Nuclear Research, watching their computers sift the debris from primordial collisions in search of new particles and forces of nature, **and plan to keep at it for at least the next 20 years.** But what if nobody answers? What if there is nothing new to discover? That prospect is now a cloud hanging over the physics community.
It's been five years and more than seven quadrillion collisions of protons since 2012, when the collider **discovered the Higgs boson, the particle that explains why some other elementary particles have mass**
If the **theory of supersymmetry is correct, there should be a whole new set of elementary particles to be discovered, so-called super-partners of the quarks and the electrons** and the other particles we already know and love. Clouds of them left over from the Big Bang, moreover, could make up the mysterious dark matter that astronomers say constitutes a quarter of the universe and whose gravitational pull controls the fates of galaxies.
Colliders get their mojo from Einstein's equivalence of mass and energy. When a pair of protons collide in the Large Hadron Collider, they recreate a smidgen of the original Big Bang that jump-started the cosmos. Whatever forms of matter can be made from that bank of energy — particles and forces that held sway when the universe was young — can reappear and briefly strut their stuff through labyrinths of electronic detectors and computers.So far they are still failing. In May, a new analysis by the 3,000 physicists monitoring the big **Atlas detector (one of two main detectors in the CERN tunnel) reported no hints of superparticles up to a mass of almost 2 trillion electron volts.** The idea that the Large Hadron Collier would discover the **Higgs boson** but nothing else has long been physicists' worst nightmare. Among other things, it would leave them with no explanation for their greatest achievement: the Higgs itself. **(((According to CERN, the long-sought boson, the keystone to the Standard Model, weighs 125 billion electron volts, or as much as a whole iodine atom.)))**