Higgs Boson Decaying to Bottom Quarks

On 9 July, at the 2018 International Conference on High Energy Physics (ICHEP) in Seoul (South Korea), the ATLAS experiment reported a preliminary result establishing the observation of the Higgs boson decaying into pairs of b quarks, furthermore at a rate consistent with the Standard Model prediction. [9]

Usha Mallik and her team used a grant from the U.S. Department of Energy to help build a sub-detector at the Large Hadron Collider, the world's largest and most powerful particle accelerator, located in Switzerland. They're running experiments on the sub-detector to search for a pair of bottom quarks— subatomic yin-and-yang particles that should be produced about 60 percent of the time a Higgs boson decays. [8]

A new way of measuring how the Higgs boson couples to other fundamental particles has been proposed by physicists in France, Israel and the US. Their technique would involve comparing the spectra of several different isotopes of the same atom to see how the Higgs force between the atom's electrons and its nucleus affects the atomic energy levels. [7]

The magnetic induction creates a negative electric field, causing an electromagnetic inertia responsible for the relativistic mass change; it is the mysterious Higgs Field giving mass to the particles. The Planck Distribution Law of the electromagnetic oscillators explains the electron/proton mass rate by the diffraction patterns. The accelerating charges explain not only the Maxwell Equations and the Special Relativity, but the Heisenberg Uncertainty Relation, the wave particle duality and the electron's spin also, building the bridge between the Classical and Relativistic Quantum Theories. The self maintained electric potential of the accelerating charges equivalent with the General Relativity space-time curvature, and since it is true on the quantum level also, gives the base of the Quantum Gravity. The diffraction patterns and the locality of the self-maintaining electromagnetic potential explains also the Quantum Entanglement, giving it as a natural part of the relativistic quantum theory.

Contents

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Preface

Popular questions about the Higgs Field:

1.) If the Higgs field is responsible for imbuing particles with mass, and mass is responsible for gravity, is it possible that the Higgs field will provide the missing link between general relativity and quantum mechanics i.e. could the Higgs field be the basis of a quantum theory of gravity?

2.) Can the theoretical Higgs Field be used as the "cause" of relativistic momentum or relativistic kinetic energy of a moving body?

3.) Does Einstein's General Relativity need to be adjusted for the Higgs field?

4.) Since the Higgs field gives most particles mass, and permeates all space, then GR needs the Higgs field to be a theory of space?

5.) So where GR is highly curved, the Higgs field is also curved? And does a highly curved Higgs field affect the way particles acquire mass? For that matter, a curved space-time would also curve electromagnetic field?

How can we answer these questions?

There is an explanation of the magnetic effect caused by the electric current from the observed effects of the accelerating electrons, causing naturally the experienced changes of the electric field potential along the electric wire. The charge distribution is lowering in the reference frame of the accelerating charges linearly: $ds/dt = at$ (time coordinate), but in the reference frame of the current it is parabolic: $s = a/2\ t^2$ (geometric coordinate). The accelerating electrons explain not only the Maxwell Equations and the Special Relativity, but the Heisenberg Uncertainty Relation, the wave particle duality and the electron's spin also, building the bridge between the Classical and Quantum Theories. [1]

One origin of the Quantum Physics is the Planck Distribution Law of the electromagnetic oscillators, giving equal intensity for 2 different wavelengths on any temperature. Any of these two wavelengths will give equal intensity diffraction patterns, building different asymmetric constructions, for example proton - electron structures (atoms), molecules, etc. Since the particles are centers of diffraction patterns they also have particle – wave duality as the electromagnetic waves have. The Electroweak Interaction shows that the Weak Interaction is basically electromagnetic in nature. The arrow of time shows the entropy grows by changing the temperature dependent diffraction patterns of the electromagnetic oscillators. [2]

Higgs boson observed decaying to b quarks

On 9 July, at the 2018 International Conference on High Energy Physics (ICHEP) in Seoul (South Korea), the ATLAS experiment reported a preliminary result establishing the observation of the Higgs boson decaying into pairs of b quarks, furthermore at a rate consistent with the Standard Model prediction.

The Brout-Englert-Higgs mechanism solves the apparent theoretical impossibility of weak vector bosons (W and Z) to have mass. The discovery of the Higgs boson in 2012 was a triumph of the Standard Model. The Higgs field can also be used in an elegant way to provide mass to charged fermions (quarks and leptons) through interactions involving Yukawa couplings with strength proportional to the particle mass. The observation of the Higgs boson decaying into pairs of τ leptons provided the first direct evidence of this type of interaction.

Six years after its discovery, the ATLAS experiment at CERN observed about 30 percent of the Higgs boson decays predicted in the Standard Model. However, the favoured decay of the Higgs

boson into a pair of b quarks (H→bb), which is expected to account for almost 60 percent of all possible decays, has remained elusive up to now. Observing this decay mode and measuring its rate is a mandatory step to confirm or disconfirm the mass generation for fermions via Yukawa interactions, as predicted in the Standard Model.

At the 2018 International Conference on High Energy Physics (ICHEP) in Seoul (South Korea), the ATLAS experiment reported a preliminary result establishing the observation of the Higgs boson decaying into pairs of b quarks at a rate consistent with the Standard Model prediction. It is necessary to exclude at a level of one in 3 million the probability that the decay detection arises from a fluctuation of the background that could mimic the process. When such a probability is at the level of only one in 1000, the detection is qualified as "evidence." Evidence of the H→bb decay was first provided at the Tevatron in 2012, and a year ago by the ATLAS and CMS Collaborations, independently.

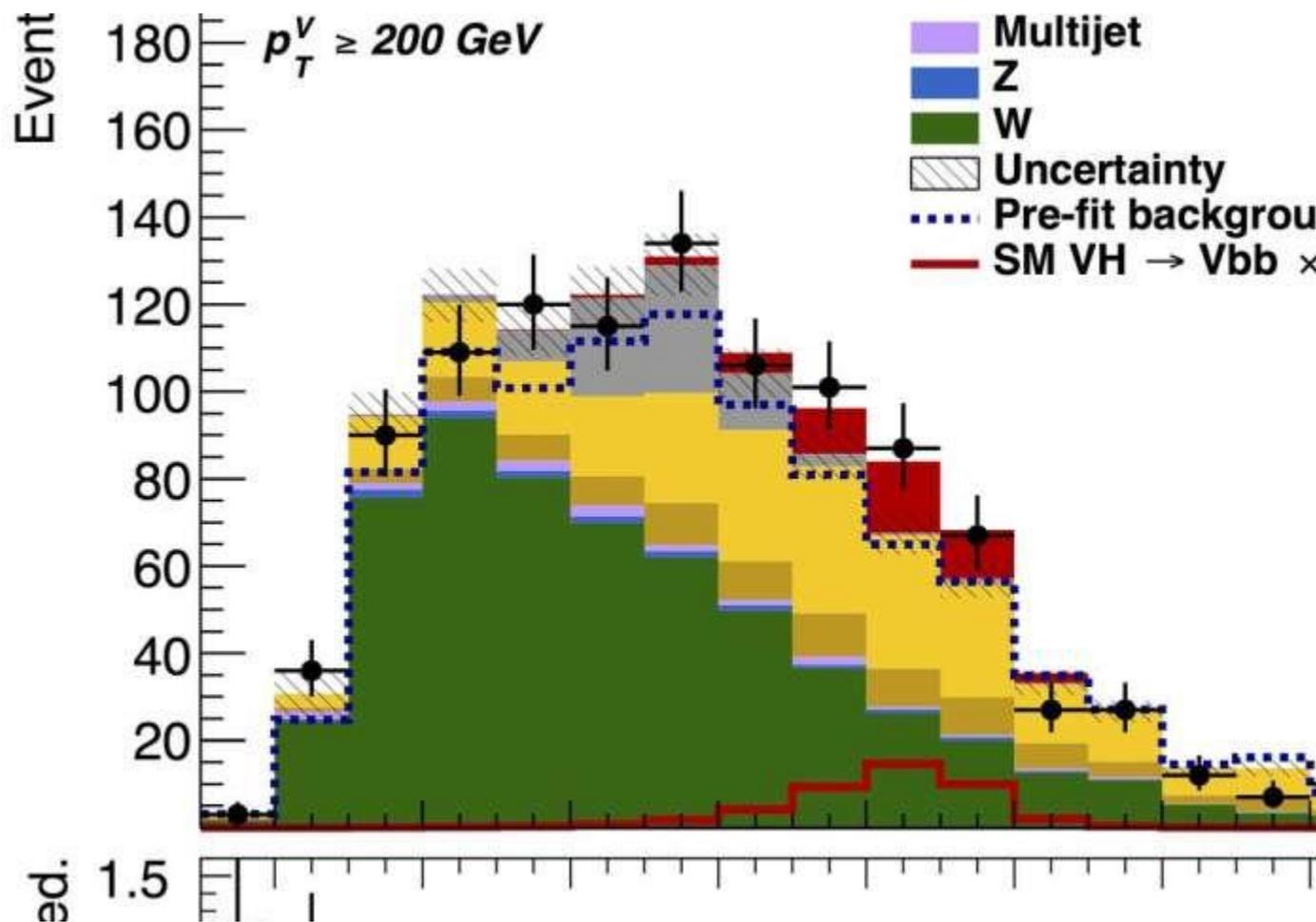Figure 1: Distribution of mbb in the (W→ℓν)(H→bb) search channel. The signal is shown in red, the different backgrounds in various colours. The data are shown as points with error bars. Credit: ATLAS Collaboration/CERN

Combing through the haystack of b quarks

Given the abundance of the H→bb decay, and how much rarer decay modes such as H→γγ had already been observed at the time of discovery, why did it take so long to achieve this observation?

The main reason is that the production process for the Higgs boson in proton-proton interactions leads to a single pair of particle jets originating from the fragmentation of b quarks (b-jets). These are almost impossible to distinguish from the overwhelming background of b-quark pairs produced via the strong interaction (quantum chromodynamics or QCD). To overcome this challenge, it was necessary to consider production processes that are less copious, but exhibit features not present in QCD. The most effective of these is the associated production of the Higgs boson with a vector boson, W or Z. The leptonic decays, W→ℓν, Z→ℓℓ and Z→νν (where ℓ stands for an electron or a muon) provide signatures that allow for efficient triggering and powerful QCD background reduction.

However, the Higgs boson signal remains orders of magnitude smaller than the remaining backgrounds arising from top quark or vector boson production, which lead to similar signatures. For instance, a top quark pair can decay as tt→[(W→ℓν)b][(W→qq)b] with a final state containing an electron or a muon and two b quarks, exactly as the (W→ℓν)(H→bb) signal.

The main handle to discriminate the signal from such backgrounds is the invariant mass, m_{bb}, of pairs of b-jets identified by sophisticated "b-tagging" algorithms. An example of such a mass distribution is shown in Figure 1, where the sum of the signal and background components is confronted to the data.
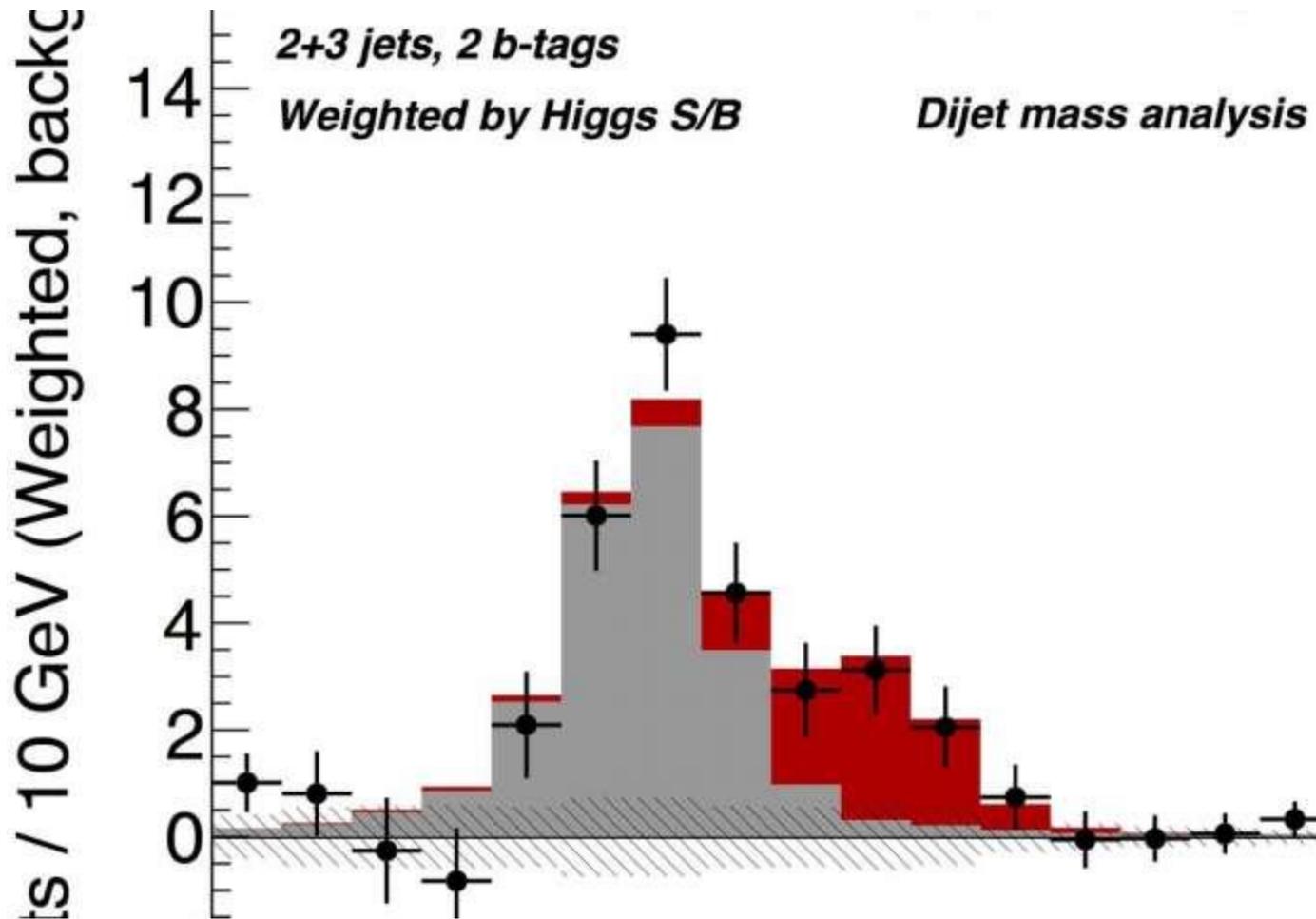
Figure 2: Distribution of mbb from all search channels combined after subtraction of all backgrounds except for WZ and ZZ production. The data (points with error bars) are compared to the expectations from the production of WZ and ZZ (in …more

When all WH and ZH channels are combined and the backgrounds (apart from WZ and ZZ production) subtracted from the data, the distribution shown in Figure 2 exhibits a clear peak arising from Z boson decays to b-quark pairs, which validates the analysis procedure. The shoulder on the upper side is consistent in shape and rate with the expectation from Higgs boson production.

This is, however, not sufficient to reach the level of detection that can be qualified as observation. To this end, the mass of the b-jet pair is combined with other kinematic variables that show distinct differences between the signal and the various backgrounds, for instance the angular separation between the two b-jets, or the transverse momentum of the associated vector boson. This combination of multiple variables is performed using the technique of boosted decision trees (BDTs). A combination of the BDT outputs from all channels, reordered in terms of signal-to-background ratio, is shown in here. It can be seen that the signal closely follows the distribution expected from the Standard Model. The BDT outputs are subjected to a sophisticated statistical analysis to extract the "significance" of the signal. This is another way to measure the probability of a fake observation in terms of standard deviations, σ, of a Gaussian distribution. The magic number corresponding to the observation of a signal is 5σ.

The analysis of 13 TeV data collected by ATLAS during Run 2 of the LHC in 2015, 2016 and 2017 leads to a significance of 4.9σ – almost sufficient to claim observation. This result was combined with those from a similar analysis of Run 1 data and from other searches by ATLAS for the H→bb decay mode, namely where the Higgs boson is produced in association with a top quark pair or via a process known as vector boson fusion (VBF). The significance achieved by this combination is 5.4σ.

Furthermore, combining the present analysis with others that target Higgs boson decays to pairs of photons and Z bosons measured at 13 TeV provides the observation at 5.3σ of associated VH (V = Z or W) production, in agreement with the Standard Model prediction. All four primary Higgs boson production modes at hadron colliders have now been observed, of which two only this year. In order of discovery: (1) fusion of gluons to a Higgs boson, (2) fusion of weak bosons to a Higgs boson, (3) associated production of a Higgs boson with two top quarks, and (4) associated production of a Higgs boson with a weak boson.

With these observations, a new era of detailed measurements in the Higgs sector opens up, through which the Standard Model will be further challenged. [9]

A quark like no other: Searching for 'bottom quark'

A University of Iowa physicist is at the forefront of the search for a missing particle that could prove whether the Higgs boson—believed to give mass to all matter—exists.

Usha Mallik and her team used a grant from the U.S. Department of Energy to help build a subdetector at the Large Hadron Collider, the world's largest and most powerful particle accelerator, located in Switzerland. They're running experiments on the sub-detector to search for a pair of bottom quarks—subatomic yin-and-yang particles that should be produced about 60 percent of the time a Higgs boson decays.

Evidence of these bottom quarks would confirm the existence of the Higgs boson, sometimes referred to as the "God particle." The Higgs' apparent discovery in 2012 seemed to support the Standard Model, the prevailing theory in physics about how the laws governing the universe work.

But since that find, there's been a hitch: The bottom quarks expected to arise from a Higgs boson's decay have yet to be seen, and scientists need that to happen to know for sure the Higgs, in fact, exists.

"Until we're sure whether it's a Standard Model Higgs or an imposter mixed with another kind of Higgs, we are desperate to learn what is beyond the Standard Model. The Higgs is our window beyond the Standard Model," Mallik says.

Still, the quest remains complicated: A Higgs boson is created about once in 10 trillion tries. Moreover, Higgs bosons decay into other particles almost instantly after they are produced, which makes detecting and defining their decaying constituents—such as the bottom quarks—even more challenging.

Mallik and her team hope to observe bottom quarks by following the post-collision clutter that arises from the decay of the Higgs or other new heavy particles similar to it.

"It's basically identifying, picking that needle in the haystack while not getting fooled by something else," says Mallik, who spent the past academic year at ATLAS, one of four particle detectors at the Large Hadron Collider. "That is the challenge."

Mallik, three postdoctoral researchers, a graduate student, and a software engineer from the UI have all been at ATLAS sifting through the voluminous data produced by the collisions. Their work is funded through the High Energy Physics program, part of the U.S. Department of Energy's Office of Science.

Anindya Ghosh, a first-year UI graduate student from India joined Mallik's group in 2015 after hearing her speak the year before at the Indian Institute of Technology in Madras, India. Ghosh worked with the ATLAS experiments over most of last summer.

He calls it "a fantastic place" to be, with hundreds of scientists, students, and teachers joined in the same quest.

"It's a really great opportunity for a new student like me to learn from the experts," Ghosh says.

The attempt to understand the underpinnings of the universe—and human existence—has always fascinated Mallik.

"It's always interested me," she says. "How did we come into being? What led to our universe? It's a fundamental question in many forms." [8]

Physicists plan to seek Higgs force in atomic spectra

A new way of measuring how the Higgs boson couples to other fundamental particles has been proposed by physicists in France, Israel and the US. Their technique would involve comparing the spectra of several different isotopes of the same atom to see how the Higgs force between the atom's electrons and its nucleus affects the atomic energy levels.

The effect of the Higgs force is tiny, but the researchers say the test would involve technologies that already exist and that some of the required measurements have already been made. The measurement would provide important information about how the Higgs couples to electrons and quarks, and would complement data gleaned from collisions using the Large Hadron Collider (LHC) at CERN.

Important mysteries

After discovering the Higgs boson at the LHC in 2012, particle physicists now want to understand how it couples to matter such as electrons and quarks. Any deviations in these couplings from the Standard Model of particle physics could reveal whether the Higgs mechanism is responsible for the masses of charged fermions, including the electron. A new way of measuring these deviations has been proposed by Cédric Delaunay of the CNRS, France, Roee Ozeri and Gilad Perez of the Weizmann Institute of Science in Israel and Yotam Soreq of the Massachusetts Institute of Technology in the US.

According to the Standard Model, the Higgs coupling creates an attractive force between the electron and the nucleus. This force decays rapidly with distance from the nucleus, which means it will have a much greater effect on electrons in S orbitals (which overlap the nucleus) than on electrons in P, D or F orbitals (which do not). The energies of photons emitted when an electron moves from a P, D or F orbital to an S orbital would therefore be greater than if the Higgs force were not present.

One way of looking for this difference would be to use different isotopes of the same nucleus. As the isotopes would have different numbers of neutrons, the Higgs force should be greater for those isotopes with more neutrons. That would lead to a difference in energy between the same atomic transition in different isotopes – the Higgs shift.

Linear thinking

The problem is that there are other isotopic differences in atomic spectra that are much larger than those related to the Higgs force. The mass shift (MS) is related to the effect of the different masses of isotopic nuclei and the field shift (FS) to the different charge distributions found in different isotopes. While the MS and FS are fiendishly hard to calculate, there is a well-known linear relationship that links the FS and MS parameters to the observed shifts.

The team's idea is to measure the shifts of two different transitions in four isotopes of the same atom and display the data on a "King plot". If there is no Higgs coupling, the data will be represented by a straight line. But if there is a Higgs coupling – and it is described by the Standard Model – there will be a tiny deviation from a straight line. It is likely that this deviation will be too small to measure, but if the Higgs coupling is much larger than predicted by the Standard Model, the researchers say it should be measureable using state-of-the-art atomic spectroscopy.

Delaunay and Soreq told physicsworld.com that such a measurement could provide important information to particle physicists who are trying to understand how the Higgs couples to quarks and electrons – something that will be difficult to extract from LHC collision data. "The method we propose is an example – the first one as far as we know – of how table-top experiments may give us complementary information," they explain. "This is important to better understand the origin of the mass of the building blocks of matter – is it the Higgs mechanism, or other, unknown sources?"

"Intriguing new application"

"Qualitatively, their arguments make sense," says Andrei Derevianko of the University of Nevada, Reno. "However, detailed atomic-structure analysis is needed – and they are clearly aware of this need – to make sure that the effect is indeed as large as they claim."

Marianna Safronova of the University of Delaware also thinks that the proposal could be viable, but points out that a successful experiment would have to accurately separate the effects of the weak interaction. She also agrees with the team's conclusion that ytterbium isotopes would be a good place to look for the effect, buts adds that calcium may be another viable candidate. Dmitry Budker, an experimental physicist at the University of California, Berkeley, told physicsworld.com that he plans to collaborate with the team to try to make the measurements. "It is not yet clear what specific atomic system – which atoms and/or ions – will be best for this, and so it is also not clear where the experiments will be done. I see an exciting possibility of potentially doing these tests in a range of systems and at different laboratories and facilities." [7]

Quantum entanglement

Measurements of physical properties such as position, momentum, spin, polarization, etc. performed on entangled particles are found to be appropriately correlated. For example, if a pair of particles is generated in such a way that their total spin is known to be zero, and one particle is found to have clockwise spin on a certain axis, then the spin of the other particle, measured on the same axis, will be found to be counterclockwise. Because of the nature of quantum measurement, however, this behavior gives rise to effects that can appear paradoxical: any measurement of a property of a particle can be seen as acting on that particle (e.g. by collapsing a number of superimposed states); and in the case of entangled particles, such action must be on the entangled system as a whole. It thus appears that one particle of an entangled pair "knows" what measurement has been performed on the other, and with what outcome, even though there is no known means for such information to be communicated between the particles, which at the time of measurement may be separated by arbitrarily large distances. [6]

The Classical Relativistic effect

The moving charges are self maintain the electromagnetic field locally, causing their movement and this is the result of their acceleration under the force of this field.
In the classical physics the charges will distributed along the electric current so that the electric potential lowering along the current, by linearly increasing the way they take every next time period because this accelerated motion. [1]

The Relativistic Quantum Mechanics

The same thing happens on the atomic scale giving a dp impulse difference and a dx way difference between the different part of the not point like particles.

Commonly accepted idea that the relativistic effect on the particle physics it is the fermions' spin - another unresolved problem in the classical concepts. If the electric charges can move only with accelerated motions in the self maintaining electromagnetic field, once upon a time they would reach the velocity of the electromagnetic field. The resolution of this problem is the spinning particle, constantly accelerating and not reaching the velocity of light because the acceleration is radial.

The Heisenberg Uncertainty Relation

I think that we have a simple bridge between the classical and quantum mechanics by understanding the Heisenberg Uncertainty Relations. It makes clear that the particles are not point like but have a dx and dp uncertainty.

The General Relativity - Electromagnetic inertia and mass

Electromagnetic Induction
Since the magnetic induction creates a negative electric field as a result of the changing acceleration, it works as an electromagnetic inertia, causing an electromagnetic mass. [1]

Relativistic change of mass
The increasing mass of the electric charges the result of the increasing inductive electric force acting against the accelerating force. The decreasing mass of the decreasing acceleration is the result of the inductive electric force acting against the decreasing force. This is the relativistic mass change explanation, especially importantly explaining the mass reduction in case of velocity decrease.

The frequency dependence of mass
Since $E = h\nu$ and $E = mc^2$, $m = h\nu /c^2$ that is the m depends only on the ν frequency. It means that the mass of the proton and electron are electromagnetic and the result of the electromagnetic induction, caused by the changing acceleration of the spinning and moving charge! It could be that the m_o inertial mass is the result of the spin, since this is the only accelerating motion of the electric charge. Since the accelerating motion has different frequency for the electron in the atom and the proton, they masses are different, also as the wavelengths on both sides of the diffraction pattern, giving equal intensity of radiation. [2]

Electron – Proton mass rate
There is an asymmetry between the mass of the electric charges, for example proton and electron, can understood by the asymmetrical Planck Distribution Law. This temperature dependent energy distribution is asymmetric around the maximum intensity, where the annihilation of matter and antimatter is a high probability event. In the maximum intensity no diffraction patterns with equal intensity that is no fermions only bosons. The asymmetric sides are creating different frequencies of electromagnetic radiations being in the same intensity level and compensating each other. One of these compensating ratios is the electron – proton mass ratio. The lower energy side has no compensating intensity level, it is the dark energy and the corresponding matter is the dark matter. The Planck distribution law explains the different frequencies of the proton and electron, giving equal intensity to different lambda wavelengths! Also since the particles are diffraction patterns they have some closeness to each other – can be seen as a gravitational force.

In Quantum Field Theory (QFT), particles are described by excitations of a quantum field that satisfies the appropriate quantum mechanical field equations.
The excitations of the quantum field mean diffraction patterns in my theory. [2]

Higgs Field
The Higgs mechanism is a result of something called a field that extends throughout space, even where no particles are present. This notion is probably most familiar to you from a magnetic field.

You feel a force between a magnet and your refrigerator even when "nothing" is there. A field can fill "empty" space. The Higgs field extends throughout space. Elementary particles acquire their

masses by interacting with this field. It is kind of like space is charged and particles get mass through their interactions with this charge.

The Higgs boson is not directly responsible for mass. The Higgs field is. The boson is a particle that tells us our understanding of this mechanism is correct. It also is a big clue as to where that field came from in the first place. Its discovery tells us that what we expected to be true was indeed correct, and it gives us clues as to what else might underlie the Standard Model. [4]

The Higgs boson

By March 2013, the particle had been proven to behave, interact and decay in many of the expected ways predicted by the Standard Model, and was also tentatively confirmed to have + parity and zero spin, two fundamental criteria of a Higgs boson, making it also the first known scalar particle to be discovered in nature, although a number of other properties were not fully proven and some partial results do not yet precisely match those expected; in some cases data is also still awaited or being analyzed.

In my opinion, the best explanation of the Higgs mechanism for a lay audience is the one invented by David Miller. You can find it here: http://www.strings.ph.qmul.ac.uk/~jmc/epp/higgs3.html . The field must come first. The boson is an excitation of the field. So no field, no excitation. On the other hand in quantum field theory it is difficult to separate the field and the excitations. The Higgs field is what gives particles their mass.
There is a video that gives an idea as to the Higgs field and the boson. It is here:
http://www.youtube.com/watch?v=RIg1Vh7uPyw . Note that this analogy isn't as good as the Miller one, but as is usually the case, if you look at all the analogies you'll get the best understanding of the situation.

What is the Spin?

So we know already that the new particle has spin zero or spin two and we could tell which one if we could detect the polarizations of the photons produced. Unfortunately this is difficult and neither ATLAS nor CMS are able to measure polarizations. The only direct and sure way to confirm that the particle is indeed a scalar is to plot the angular distribution of the photons in the rest frame of the centre of mass. A spin zero particles like the Higgs carries no directional information away from the original collision so the distribution will be even in all directions. This test will be possible when a much larger number of events have been observed. In the mean time we can settle for less certain indirect indicators.

The Weak Interaction

Since the Higgs boson is necessary to the W and Z bosons, the dipole change of the Weak interaction and the change in the magnetic effect caused gravitation must be conducted. The Wien law is also important to explain the Weak interaction, since it describes the T_{max} change and the diffraction patterns change. [2]

Higgs mechanism

The magnetic induction creates a negative electric field, causing an electromagnetic inertia. Probably it is the mysterious Higgs field giving mass to the charged particles? We can think about

the photon as an electron-positron pair, they have mass. The neutral particles are built from negative and positive charges, for example the neutron, decaying to proton and electron. The wave – particle duality makes sure that the particles are oscillating and creating magnetic induction as an inertial mass, explaining also the relativistic mass change. Higher frequency creates stronger magnetic induction, smaller frequency results lesser magnetic induction. It seems to me that the magnetic induction is the secret of the Higgs field.

In particle physics, the Higgs mechanism is a kind of mass generation mechanism, a process that gives mass to elementary particles. According to this theory, particles gain mass by interacting with the Higgs field that permeates all space. More precisely, the Higgs mechanism endows gauge bosons in a gauge theory with mass through absorption of Nambu–Goldstone bosons arising in spontaneous symmetry breaking.

The simplest implementation of the mechanism adds an extra Higgs field to the gauge theory. The spontaneous symmetry breaking of the underlying local symmetry triggers conversion of components of this Higgs field to Goldstone bosons which interact with (at least some of) the other fields in the theory, so as to produce mass terms for (at least some of) the gauge bosons. This mechanism may also leave behind elementary scalar (spin-0) particles, known as Higgs bosons.

In the Standard Model, the phrase "Higgs mechanism" refers specifically to the generation of masses for the $W^{\pm}$, and Z weak gauge bosons through electroweak symmetry breaking. The Large Hadron Collider at CERN announced results consistent with the Higgs particle on July 4, 2012 but stressed that further testing is needed to confirm the Standard Model.

Gravity from the point of view of quantum physics

The Gravitational force

The gravitational attractive force is basically a magnetic force.

The same electric charges can attract one another by the magnetic force if they are moving parallel in the same direction. Since the electrically neutral matter is composed of negative and positive charges they need 2 photons to mediate this attractive force, one per charges. The Bing Bang caused parallel moving of the matter gives this magnetic force, experienced as gravitational force.

Since graviton is a tensor field, it has spin = 2, could be 2 photons with spin = 1 together.

You can think about photons as virtual electron – positron pairs, obtaining the necessary virtual mass for gravity.

The mass as seen before a result of the diffraction, for example the proton – electron mass rate Mp=1840 Me. In order to move one of these diffraction maximum (electron or proton) we need to intervene into the diffraction pattern with a force appropriate to the intensity of this diffraction maximum, means its intensity or mass.

The Big Bang caused acceleration created radial currents of the matter, and since the matter is composed of negative and positive charges, these currents are creating magnetic field and

attracting forces between the parallel moving electric currents. This is the gravitational force experienced by the matter, and also the mass is result of the electromagnetic forces between the charged particles. The positive and negative charged currents attracts each other or by the magnetic forces or by the much stronger electrostatic forces!?

The gravitational force attracting the matter, causing concentration of the matter in a small space and leaving much space with low matter concentration: dark matter and energy.
There is an asymmetry between the mass of the electric charges, for example proton and electron, can understood by the asymmetrical Planck Distribution Law. This temperature dependent energy distribution is asymmetric around the maximum intensity, where the annihilation of matter and antimatter is a high probability event. The asymmetric sides are creating different frequencies of electromagnetic radiations being in the same intensity level and compensating each other. One of these compensating ratios is the electron – proton mass ratio. The lower energy side has no compensating intensity level, it is the dark energy and the corresponding matter is the dark matter.

The Graviton
In physics, the graviton is a hypothetical elementary particle that mediates the force of gravitation in the framework of quantum field theory. If it exists, the graviton is expected to be massless (because the gravitational force appears to have unlimited range) and must be a spin-2 boson. The spin follows from the fact that the source of gravitation is the stress-energy tensor, a second-rank tensor (compared to electromagnetism's spin-1 photon, the source of which is the four-current, a first-rank tensor). Additionally, it can be shown that any massless spin-2 field would give rise to a force indistinguishable from gravitation, because a massless spin-2 field must couple to (interact with) the stress-energy tensor in the same way that the gravitational field does. This result suggests that, if a massless spin-2 particle is discovered, it must be the graviton, so that the only experimental verification needed for the graviton may simply be the discovery of a massless spin-2 particle. [3]

Conclusions
The electric currents causing self maintaining electric potential is the source of the special and general relativistic effects. The Higgs Field is the result of the electromagnetic induction. The Graviton is two photons together.

The accelerated charges self-maintaining potential shows the locality of the relativity, working on the quantum level also. [1]
The Secret of Quantum Entanglement that the particles are diffraction patterns of the electromagnetic waves and this way their quantum states every time is the result of the quantum state of the intermediate electromagnetic waves. [2]

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