The quantum world

Business

When you think of physics you’re probably thinking of ideas such gravity or general relativity. However there’s much more than that in the physics world, for example, take quantum physics. Which is so recent it’s original research started in the early 1900’s, since then our understanding of it has drastically increased, so what the hell is quantum physics anyways? Quantum physics is the science of the anomalies we cannot observe because they’re simply too small to see, such as the uncertainty principle, which basically states you cannot find both the momentum and position of a particle at the same time. Quantum physics is based off of probability , just like everything else in life, nothing is ever guaranteed 100%. Now compare this to classical physics which explains the phenomena we experience in everyday life such as Newton’s laws of motion and you’ll see the difference between the range these two things truly cover. The one of the most important parts of quantum physics is the atom, the building block of the universe as we know it.

It has a dense nucleus with a positive charge due to its protons and it has a cloud of electrons with a negative charge. Usually the amount of protons and electrons are balanced however they aren’t always, the imbalance between atoms is referred to as ionization. Whenever there’s more protons than electrons the atom has a positive charge and is referred to as a cation, whenever there’s more electrons than protons it’s called an anion. These atoms bond in several ways creating molecules which form the majority of the things we know. Light, it’s what makes life possible and it’s what separates quantum and classical physics.

In classical physics an object is either a wave of energy or a particle. In quantum physics light is referred to as both a wave and a particle. A particle of light is referred to as a photon. This is explained best as Wave-Particle Duality Theory, which is the idea that all matter has properties of waves and particles. Now you probably are wondering what is even smaller than subatomic particles such as a proton? Well some are what's referred to as a quark .

Quarks actually make up protons and neutrons, there's six different kinds of quarks but for simplicity they're in three groups. Up/down, top/bottom, and charm/strange. Quarks are never found alone, they're quite the social butterflies, they are always found in groups referred to as Hadrons. Now there's two different types of Hadrons, such as Baryons which have three quarks in them, these are what neutrons and protons are. The next type of quark is the Meson, which has one quark and an antiquark. You might have noticed how I said some particles are referred to as quarks, well that would be because there's actually another kind of particle that makes up subatomic particles.

The other kind of particle of matter is referred to as a lepron. There's six known leptons at the moment, three have electric charges, three don't. The most well known one is the electron. The last group of particles is referred to as force carrier particles. Their role is best imagined as balls thrown between matter particles like quarks and leptons.

There's four major interactions these particles can have called forces. The four forces are gravity, electromagnetic, and the two nuclear forces, weak

and strong. Pauli Exclusion principle, it’s the idea that particles in the same atom cannot share the same quantum state. Since then there’s been advancements in the field, there are particles discovered which do not follow this principle. Quarks and leptons follow the principal and are classified as fermions, force carrier particles do not obey the Pauli Exclusion principle and are called bosons.

The most recently discovered boson is the Higgs Boson. The Higgs Boson is the reason why all the other particles contain mass. The reason for all that mass is unknown at this moment of time, but like always, science will find the answer.