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Quark Theory in Automotive Engineering and Telecommunications

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Abstract:

This is a theory based on radiation and pollution in today's lifestyle. This is a kind of research thesis of providing an alternative technology for automotive engineering as well as for the renewable energy resources. This concept makes the whole world efficient in using automotive, Telecommunication, and Power. This concept does not involve the use of anything which causes radiation above the permissible limit in India. This module explains the concept with the help of proper Pictures, Charts and different scenarios of areas which are being affected the most because of the available technology today. Today's Automobiles and Smartphones are causing humongous amount of pollution and radiation respectively. The oldest generation used Diesel in vehicles as a fuel, in later times they used Petrol and gasoline as a fuel. After knowing the circumstances caused by the use of fuels mentioned above, they started using LPG and CNG as fuels in vehicles, and Hydrogen in Rockets. Post the advancement of technology as well as knowledge in the areas of electronics and electrical engineering to integrate with automobile engineering, they are now using electric vehicles and electronic sensor modules. We can implement Quark theory in producing the above products.Quark theory in producing the above products. Quark theory in such areas prevents pollution and radiation as well.

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I. INTRODUCTION

Quark is one of the smallest particles among those are available as of now. An electron was actually considered as the smallest particle until Quark was discovered by Murray Gell-Mann and George Zweig in 1964. These two physicists proposed the concept of Quark solely. Quarks were introduced while a series of experiments on elastic properties of particles, as a part of ordering scheme of Hadrons. There was a very little evidence on inelastic scattering experiments in Stanford Linear Accelerator Centre in 1968. These two gentlemen introduced six flavours of quark namely, up, down, top, bottom, strange and charm. Quarks make up the p rotons and neutrons inside atoms. All the above six flavours were introduced based on their masses, charges and spin they possess. Quarks combine to form composite particles, called Hadrons. The most stable of which are Protons and Neutrons. An atom is basically composed of up and down quarks as well as electrons. In an atom, quarks are never found isolated, instead they are found only within the Hadrons due to a phenomenon called *colour confinement.* Quarks possess many intrinsic properties like electric charge, mass, colour, and spin. Different flavours of quarks have different properties. They can undergo all fundamental forces which exist in nature on the earth, like gravitation, electromagnetism, strong interaction, and weak interaction. Among the six flavours, up and down quarks are the lightest, heavier quarks very soon change into up and down quarks through a process called particle decay. Due to this nature, only up and down quarks are the most stable and commonly available. The remaining top, bottom, strange, and charm can be made available with high energy collisions like, cosmic rays and particle accelerators.

Every quark has a corresponding antiparticle called *anti-quark*, both the opposite quarks have the same magnitude but opposite sign. Every proton constitutes of two up quarks and a down quark which are bound to each other by a particle called *gluon*.

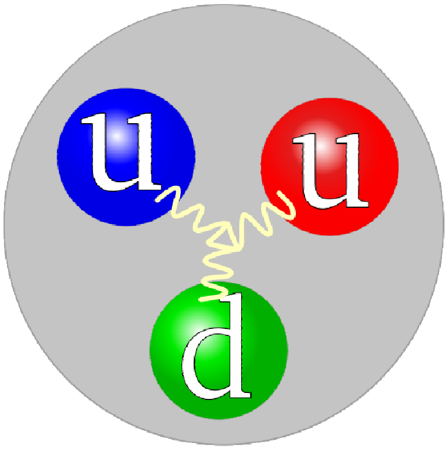


Figure 1: Up quarks, Down quarks and Gluons.

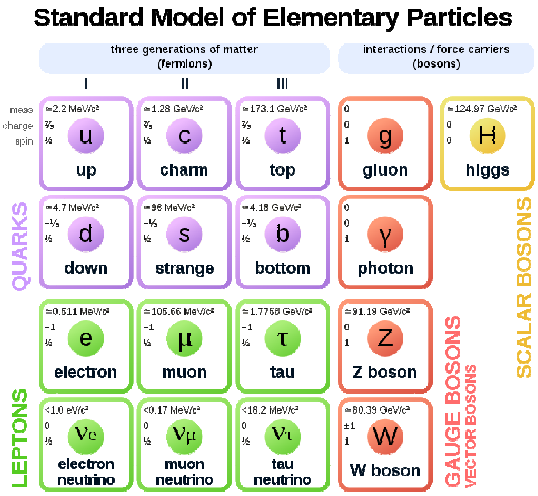


Figure 2: Standard model of elementary particles.

All quarks are spin-$\frac{1}{2}$particles, and fall under the category of fermions

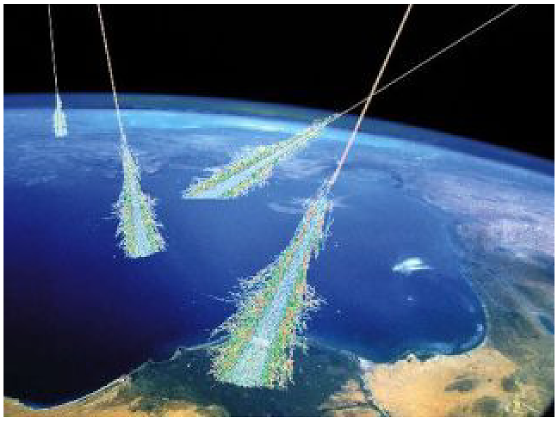
Quarks have fractional electrical charges, either $-\frac{1}{3}$ or $+\frac{2}{3}$times the elementary electrical charge(e). Up, Charm, and Topquarks have the charge of $+\frac{2}{3}$e and Down, Strange, and Bottom quarks have the charge of $-\frac{1}{3}$e. The anti-quarks have the exact opposite charge.

Quarks are not much larger than 10^{-4} times the size of protons.

II. CONCEPT

Electrons are moved in a path by placing an exact opposite charge next to the conductor, by doing that electrons attract towards such placed charge. This way electrons are move and are used to control electrical and electronic appliances in our daily life as we see.

In the same way, we have different approaches to move the quarks. We can use cosmic rays to excite quarks. As quarks are very light and very small, they require huge amount force. Cosmic rays are high energy protons which move through the space at a speed of light. Quarks are moved when they are subjected to the force caused by cosmic rays.



(Image: © Simon Swordy (U. Chicago), NASA)

Figure 3: Cosmic rays

There is also another method to move a quark, which is by using particle accelerator. A particle accelerator is a machine uses electromagnetic fields to propel the charged particles. As quarks come under fermions, they do exhibit electromagnetic properties and they are charged as well.

When quarks are inside the field in the direction of electromagnetic field exerted by the particle accelerator, the quarks move along that direction. In this method large force is not required to move a quark because of its smaller charge.

As quarks are 10000 times smaller than electrons, they require much lesser force which is required for propelling a quark. This method is more advantageous over the cosmic ray method, considering few major drawbacks of cosmic ray technology since they are made of protons of an atom.Once the gluon is removed the binding of quarks, quarks can be used individually for any purpose. For doing this we need to know about gluon at first. A gluon is an elementary particle which glues quarks together. Gluons exhibit strong interaction like photons, but they are analogous to photons. A thing that differentiate both is:luons themselves carry a *colour-charge* of the strong interaction. This is unlike a *photon*, which mediates the *electromagnetic interaction* but lacks an *electric charge*.

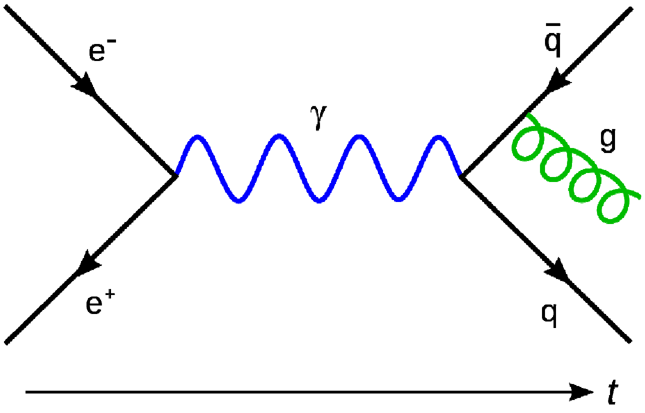


Figure 4: Feynman diagram of emitted gluons, represented as helices.

Although gluons exhibit strong interaction, they can be removed, or the bonds are broken easily because they do not possess any charge. Gluons have spin 1, usually spin-1 particle exhibit three polarization states. So, in order to remove them we need to apply the technique of *Reverse Polarization or Depolarization.*

Depolarisation refers to a sudden change in membrane potential – usually from a (relatively) negative to positive internal charge.

Once gluon is broken, we are free to use quarks we get after the breakage. Such obtained quarks can be used in any applications. In this scenario, in *Telecommunication* and *Automobile Engineering*.

III. AUTOMOBILE ENGINEERING

In order to understand and implement this quark technology in automobiles, we need to know a vehicle works at the first place. Every vehicle, be it a two-wheeler or a four-wheeler, the process of combustion is similar with just a difference of mechanism of the two vehicles.

Combustion and mechanism are same for oil and well as gas engines. Fuel which is stored in the fuel tank goes into the combustion chamber through nozzles, in the combustion chamber the fuel happens to react with oxygen in order to cause a combustion reaction (Combustion is a process of burning and producing energy in the presence of oxygen). One after the energy is produced in the engine, that force is supplied to the motor to rotate at a certain Torque and RPM depending on the amount of energy generated.

Whereas in electric vehicles this is not the case, energy is supplied from a lithium-ion battery which is placed in the vehicle. This power from the battery is directly given to the motor, and motor makes its shaft to rotate according to the amount of electricity received, this is controlled by a resistor device. In this way it processes certain amount of Torque as well as RPM to move the vehicle.

Now, in this certain scenario we can use both the above techniques to use quark technology in vehicles. If we have to use fuel engines, we will need to store the energy generated by the quarks with the help of particle accelerator, in a different storage system, this can raise complexity and cost involved in the overall process. Instead we can recreate the method of electric cars in this way- we can directly incorporate a particle accelerator itself in a vehicle as its engine, particle accelerator will be turned on, by giving sufficient power to it.

Particle accelerators use electric fields to speed up and increase the energy of a *beam* of **particles**, which are steered and focused by *magnetic fields*. Electric fields spaced around the **accelerator** switch from positive to negative at a given frequency, creating **radio waves** that accelerate **particles** in **bunches**

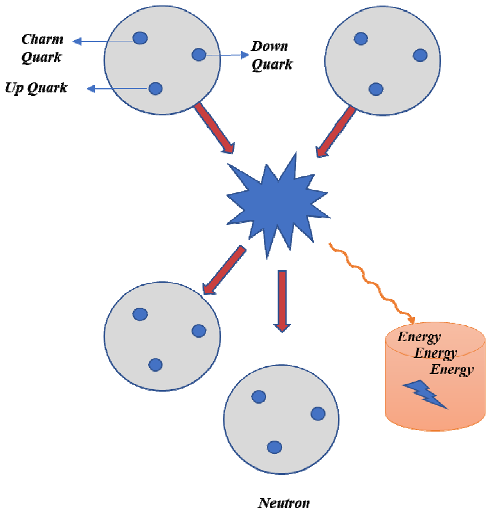


Figure 5: Storing Energy Emitted by Quarks.

In order to provide electrical field to the particle accelerator as input, we need to have a battery pack inside the vehicle as in electric vehicles. When we turn the particle accelerator ON, it takes power from the battery to run. As a result of running of particle accelerator quarks energize to produce energy, which would be large enough to run an engine as well as a motor. One of the best advantages of using this is as a result of usage of the energy generated by quarks emits no pollution. Even though that emits pollution that cannot be felt until ages. As already mentioned above in [I], due to their smaller size which can [pass through the air, they don't settle on the ground to radiate pollution. If at all they cause radiation, that will be a very small or even negligible amount.

Although particle accelerators emit radiation, they release enormous amount of energy. There is also a way to prevent some amount of radiation from it. A small-scale example of this class is the *cathode ray tube* in an ordinary old televisionset. The achievable *kinetic energy* for particles in these devices is determined by the *accelerating voltage,* which is limited by electrical breakdown.

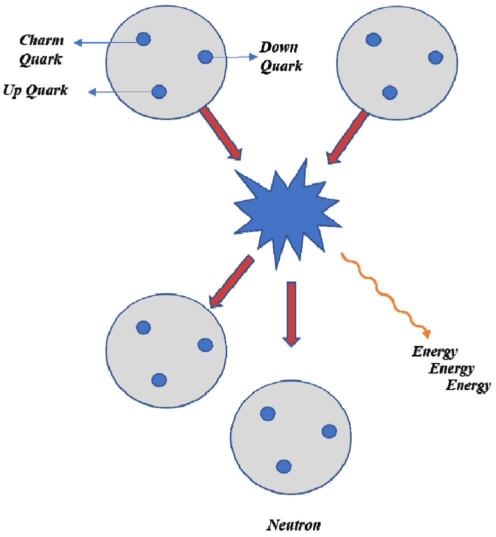


Figure 6: Emission of Energy from Particle Accelerator

Electrodynamic or electromagnetic accelerators, on the

other hand, use changing electromagnetic fields to accelerate particles. Since in these types the particles can pass through the same accelerating field multiple times, the output energy is not limited by the strength of the accelerating field. This class, which was first developed in the 1920s, is the basis for most modern large-scale accelerators.

Hence, a basic particle accelerator would be enough to produce the desired energy. We can redesign the particle accelerators with more efficiency.

IV. TELECOMMUNICATIONS

In telecommunications, if we have to apply the concept of quark theory, we can neither opt the method of cosmic rays nor the method of particle accelerators. We need to design a device which could release quarks from the atoms and should be able to transmit later. This ensures faster communication than that of radio wave communication. Since, quarks can travel at the speed of light, we can ensure faster communication. But also need to be ensured is that, due to its smaller size it travels in a scattered manner. We need to align the quarks at the first place. Later a basic amount of energy just enough to transmit the series of quarks is applied to them.

Communication can be made faster than now using quark technology. We can also reduce or completey decline the radio frequency towers for the signal transmission, as quarks are very much faster than that of radio radio waves. Same as radio waves quarks can also penetrate through the walls, human body and air. Moreover quarks can penetrate through the places which radion waves cannot. This ensures distortion free communication as well as frequency. Very less frequency is required to transmit the quark allignment when compared to that of radio waves. Quarks can pass through the places where light can obviously not penetrate. Radio waves can penetrate through the places where light cannot , but light is much faster than that of quarks.

Therefore significant amount of decrease in radiation in atmosphere as well as loss in the signal can be observed by using quark technology.

We can further ensure that, we can use quark technology based telecommunication to even use it for interstellar communication for satellites and rockets.

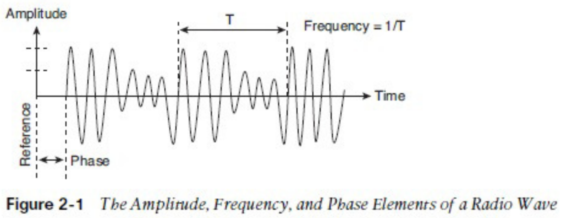


Figure 7: Radio wave transmission

Here, in the above figure decrease in amplitude can be witnessed, which does not happen using quark technology.

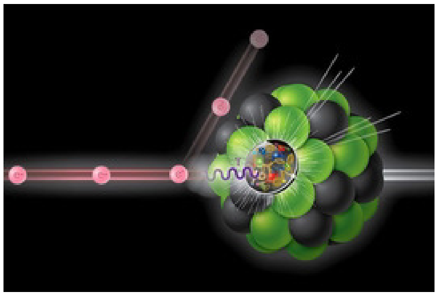
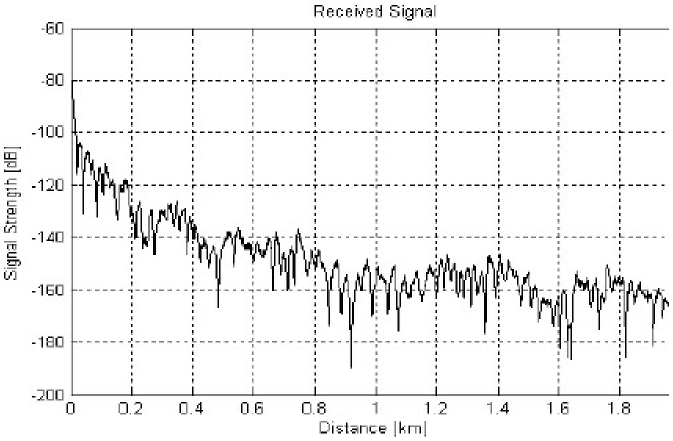


Figure 8: Speed of quark

Here in the figure above we can see that quark is travelling at a speed of 186000 Miles per second. Whereas radio signal can at a speed as same as quark at 186000 Miles per second but the difference can be observed from figure 7, it shows the loss of signal at certain times. Decrease in amplitude in the figure tells us that it has undergone certain loss so that amplitude has been decreased. A radio wave can travel very far in space than on the earth, it means that radio waves can be obstructed by air/wind/breeze. It always depends on propagation mode of wave on the earth, usually a ground wave travels up to ~300–500 **km.**

So far, the fastest telecommunication is 5G signal. But it cannot travel much longer without being amplified after certain distances, sub 6GHz and millimeter wave technologies are the options for 5G. They are not possible practically in city environment due to large number of obstacles around.



https://www.researchgate.net/profile/Jan_Duha
Figure 9: Strength of mobile signal

As shown above, the mobile signal drops as the distance increases. Hence, they need to be amplified with numerous towers in between. Direction is also decided by the towers

Whereas it is not the case with quarks, we can transmit them to any direction from specific center location. One transmitter- multiple directions method is applied. No intermediate towers required to amplified that signal. Depending upon the number of users, the bandwidth is adjusted.

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