Quantum Questions

Although science is aware of four forces in nature that hold things together, they recognize that these are ultimately parts of only one. It intrigues me that this is inherently so clear that it goes unquestioned by science -- and yet remains unproven.

The "holy grail" of quantum physics is the search for a theory that can explain how these four forces are in fact only one (In 1967 a promising theory could possibly relate three of them).

This in turn is a part of the quest for a "Grand Unified Theory" (GUT), which could ultimately explain every phenomenon of the universe. A couple thousand years ago we were provided with an explanation for all of this that has yet to be improved upon.

"… all things have been created through Him and for Him. He is before all things, and in Him all things hold together." Colossians 1:15-17

I find science a fascinating place; there are no questions we need to fear, and no truthful answers that can threaten us. All that is true and real can only contribute to our knowledge and experience of God.

We must recognize however, that our tools go beyond what we might discern or figure out through our limited senses and intellects. Faith is an integral part of Christianity, but so are mystical experiences that go beyond logic, and validate faith. As the apostle Paul himself put it "My speech and my message were not with plausible words of man's wisdom but in demonstration of the Spirit and power, so that your faith would not rest in the wisdom of men, but in the power of God" (NASB).

So while Christians might be accused of the not limiting themselves to logic, atheists must violate it to deny the miraculous experiences of millions.

Herein I offer quantum physics evidence to be challenged or discussed, that goes beyond the commonly accepted limits of today's standard explanations. Furthermore, these help us to take another step towards understanding how creation expresses the absolute nature of God.

Here are a few of the questions I'd like to address:

1. If you changed the amount of energy stored in a fixed number of atoms (whether by chemical reaction, heat or mechanical stress), would the mass change in accordance with e=mc^2? If so, what form does the mass change take? If not, is e=mc^2 imprecise?
2. Could we possibly explain gravity in terms of electrostatic attraction?
3. Is there a possible explanation for the transmission of light and other frequencies of electromagnetic radiation that could resolve the particle-VS-wave controversy – to include explaining the results of the "Double Slit" experiment?
4. If we developed a theory for gravity, could a condition be conceived that would simulate gravity in any direction of our choosing?
5. Can we make predictions that could provide experimental evidence to either support or refute any of the above propositions?

For the record: I am well aware of the audacity of some of the things I will be sharing, and of their outrageous ramifications. I am also aware of numerous related quantum phenomenon that must be simultaneously accounted for. Please bear with these facts for the time being since they do not directly relate to the primary subject at hand. Let the simplicity of the principles I offer not be missed.

In quantum physics the scales are extreme beyond comprehension. Theoretically for instance, every particle in the universe has a gravitational relationship with every other particle. The weakness of such relationships however, is generally incalculably minuscule. The point being that until actual calculations are made no proportion – no matter how absurd to our common sense – is to be categorically rejected.

1. ***Mass and Energy***

If you changed the amount of energy stored in a fixed number of atoms (whether by chemical reaction, heat or mechanical stress), would the mass change in accordance with e=mc^2? If so, what form does the mass change take? If not, is e=mc^2 imprecise?

Quantum physics already recognizes that the mass of a particle can vary without modifying its subatomic content. They use terms like “rest mass” and “bare mass” to describe particles in close proximity, and “dressed mass” for particles that are more dispersed. Not surprisingly, “dressed mass” particles are generally of higher energy and also “weigh” more.

The amount of energy required to heat one liter of water from freezing to boiling would be equivalent to approximately 4E10-12 kg of mass. So if we tried to say that this liter of water did not take on weight, we would then have to explain where else this mass might be being stored.

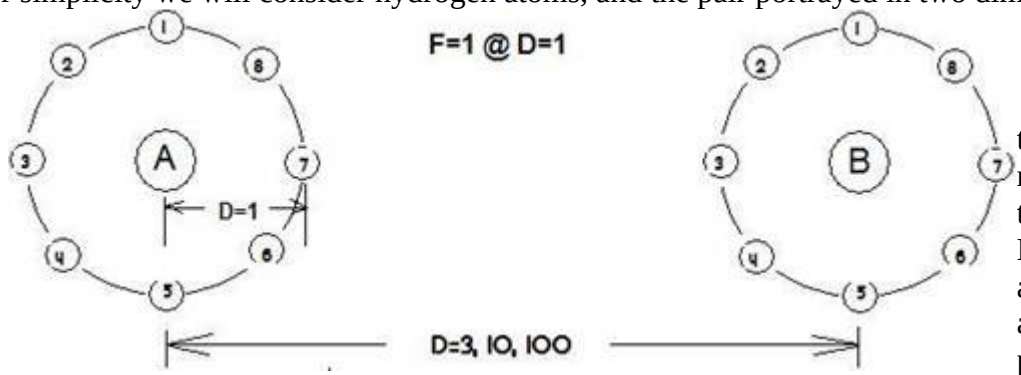
Using the classical model of the atom we have electrons orbiting nuclei. As atoms bond with other atoms to form molecules the diameters of their orbits (be they shaped as circles, ellipses, or paisleys) decrease and yield energy. This decrease in orbital range would also be true as a substance contracted while being cooled.

In relativity there is a phenomenon in which particles increase in mass as they approach the speed of light. Theoretically, there would therefore be some minuscule change in mass for any change in electron speed.

2. *Could Gravity Possibly Be...?*

Could we possibly explain gravity in terms of electrostatic attraction?

For simplicity we will consider hydrogen atoms, and the pair portrayed in two dimensions below..



If you summed the attraction and repulsion forces of the electron in atom B to the nucleus and electron of atom A, for all positions of the electrons of both atoms, you would find a net repulsion. This force would geometrically diminish with distance ever-approaching, but never quite achieving zero. Granted, the model here is two dimensional, but there would be a similar effect for a sphere.

Obviously we have something else going on that allows atoms to get close enough to bond, and for the purposes of this theory we will say that the interaction between the electrons causes some level of synchrony that allows a larger share of access of the electrons to its partner’s nucleus. The potential for attraction would be most obvious if you placed both electrons at positions 3 or 7.

Here again however, this force (attracting in this case) would diminish geometrically with distance – ever approaching, but never quite achieving zero. We need to at least recognize that given the finite speed of light, the phase of the two orbits would continually change with their distance,

So there you almost have it: An attracting force that does not require ionization, yet related to electrostatic. I say “almost” because there is another factor that would come into play that would enhance the long-range effects of this attraction, but we’ll deal with that in a little while.

3. *Light is a....*

Is there an explanation for the transmission of light and other frequencies of electromagnetic radiation that could resolve the particle-VS-wave controversy, to include explaining the results of the "Double Slit" experiment?

A rigid rod is used to connect a rotary crankshaft to a reciprocating piston. In the old steam trains rods were also used to couple rotating drive wheels.

If you had a crank of low enough friction, carrying a suitable flywheel, you could transmit rotary power by means of an elastic cord.

I am suggesting that energy could be transferred through free space via the same electrostatic mechanism I suspect is involved in gravity.

In a frictionless elastic system there would be no energy transferred unless either the distance were changing between them (as in an object falling and getting closer to the earth), or if there was a change in the velocity of one of the electrons, such as when an electron changes its orbit level.

It is commonly accepted that photons are emitted when an electron drops to a lower orbit releasing energy, with an equivalent loss of momentum. When a photon is absorbed, an electron is boosted to a higher orbit. This phenomenon correlates well with the above-proposed theory.

In a nutshell, I am proposing that light is purely a wave caused by fluctuations in electrostatic attraction associated with the orbits of electron. I further propose that these orbits are involved in the production of gravity itself.

If light is purely a wave, then why can individual photons can be detected? Puzzling results have been obtained in an experiment where individual photons can be counted, even as they accumulated in a wave-like pattern (you'll need to look up "double slit experiment" to learn more about this).

I believe the answer lies on the receiving end. In a mass of atoms with random orbits some are more likely to be both aligned and in phase with an incoming wave front than others. Beyond that, thermal activity would have some of the atoms closer to quantum energy transitions than others. The arrival of a weak wave front that is strong enough to manifest at all, would trip the most coincidentally favored target. As energy from the wave is absorbed in this process, it would become less likely to activate other targets.

Based upon this theory, if an interference pattern were available, individually activated atoms would eventually define a wave. This would also remove the need for a theory involving particles in the first place – let alone that they were being fired one at a time.

One possible test against this theory would be to otherwise prove that photons exist in a situation that could not be explained as above.

To be my own devil in this case, I would suggest that particles of any size but approximately equal energy could also seek statistically optimum atoms among the target. This could be the case if their energy were low enough that not all of them were detected. Furthermore, such particles could form interference patterns if their energy were generated or otherwise modulated by an electromagnetic wave.

4. *The Gravity Machine*

If we developed a theory for gravity, could a device be conceived that would simulate gravity in a direction of our choosing?

You have a ball on a string, and you are swinging it in a vertical arc. Naturally, if the ball travels barely fast enough to keep the string straight at the top of the arc, there is very little tension. A moment later as the ball nears the bottom of the arc the tension approaches its maximum of slightly over two g's. Wrong!

Gravity is involved, but there is also centrifugal force to consider, and since the speed of the ball varies with its position on the arc (slow at the top, and fast at the bottom), the centrifugal component of the force likewise varies in accordance with the speed.

At the top of the orbit the force is little more than the weight of the ball. If this velocity were constant throughout the orbit, the pull on the string at the bottom of the orbit would be a little more than twice the weight of the ball. This, of course, is because gravity is now adding to this 1g+ force instead of subtracting from it as it is at the top of the arc. If you subtracted gravity from the equation, the tension on the string would be the same in all directions.

But the speed of rotation is *not* constant. It is faster at the bottom, so the string pull is at least twice the weight of the ball, plus the force added by the increased velocity at the bottom of the arc. If you subtract gravity in this case, you are left with a system where the string pulls harder in one direction than in the other!

There are at least a couple manifestations of this principle that most of us have experienced in everyday life.

1. As a child I was puzzled at how swinging your feet on a swing caused you to go higher and higher. I actually did an experiment where I started from a dead stop, and began swinging my feet in phase with the pendulum I was creating. Without pushing on the ground or any other object I was soon able to develop momentum with the centrifugal force of my feet and legs alone. All this had been instinctive before I consciously tried it.
2. Have you ever been off balance and found yourself wildly swinging your arms? Why would you do such a ridiculous-looking thing – are you trying to signal to the whole world that you're a klutz? But think about it, and better yet, try it on purpose. Your hands are moving at their maximum distance from your center of gravity, and at their maximum velocity, in the direction you'd rather be going.

So now you can go out and build a machine that varies the rotational speed of a mass, include an on-bard source of energy, seal the whole thing in a tin can or a space ship, and travel where you will. This device will apply force in the direction of your choosing whether it is on land, in the air, underwater, or outer space.

OK, to belabor the obvious let's consider some of the first line of questions:

1. If you allow this system to move in the favored direction, the orbit at that point effectively lengthens and the rotating mass wants to slow down. Don't fret: Energy is being extracted from the orbit to provide forward inertia to the whole system. That's what your on-board energy source is for; acceleration takes energy. The equation will balance.
2. What about a mass that simply rotates back and forth in a single direction without doing a complete circle? Of course it would work! Go for it!
3. What about canceling out torque and vibration so the astronauts are not rattled to death? These are problem for mere mortal engineers. If you're smart enough to understand what I've shared so far, you're smart enough to figure it out.
4. In dealing with attractive forces rather than a fixed string, you are dealing with an elastic connection. What would this change? The first thing to consider is that if the system moves, energy is extracted from the orbit. Then consider whatever else you'd like to consider.
5. How is energy restored to atoms that have yielded energy? Other than seeking equilibrium with the surrounding atoms, it probably isn't. Things cool down as energy is radiated.

Before we start having too much fun with this let's revisit our gravity model set forth above. The nucleus attracting the electron of a nearby atom would also cause it to vary the velocity of its orbit. This would increase the force of its atom towards the nucleus that has its attention. There is a subtle

difference in this force however. Whereas the electron is being attracted directly, the imbalance of the electron's orbit is causing the atom to
drive itself in that same direction. This more closely models the concept of a "warping" of the universe in the presence of gravity.

Conversely, accelerating an object is going to create an imbalance in an electron's orbit, relative to the nucleus, that would tend to resist acceleration. So, this phenomenon contributes to an atom's mass, as well as its gravitational attraction. The energy thus applied is stored as kinetic energy in the object, relative to the position from which it was accelerated. Consider the fact that this also gives us relative mass (or total energy) as a function of relative speed.

The above discussions and more are covered in greater detail – to include graphs and calculations – in an obnoxiously titled essay titled "Prove Me Wrong" (# 13020), available at technosmith.com