Basic Properties

Based on TOEBI hypotheses we know that Force Transfer Ether Particles (FTEPs) are spherical, concrete, objects. Because FTEPs are spherical objects we define

Definition 1. *FTEP radius is* r_0 m

One FTEP occupies a volume

$$V_0 = \frac{4}{3}\pi r_0^3.$$

If two FTEPs are put together, they would occupy a volume twice that size.

Velocity

Definition 2. *Single FTEP can have a velocity* $\vec{v}$.

In truly empty space there is nothing which would collide, hence interact, with a single FTEP. If a single FTEP is moving into some direction it would continue doing so infinitely.

Mass

Because FTEPs must be the ingredient of all mass in TOEBI we define

Definition 3. *FTEP mass is* m_0 *kg.*

Momentum

Definition 4. *FTEP momentum* $\vec{p} = m_0\vec{v}$.

Postulate 1. *FTEP momentum is conserved quantity.*

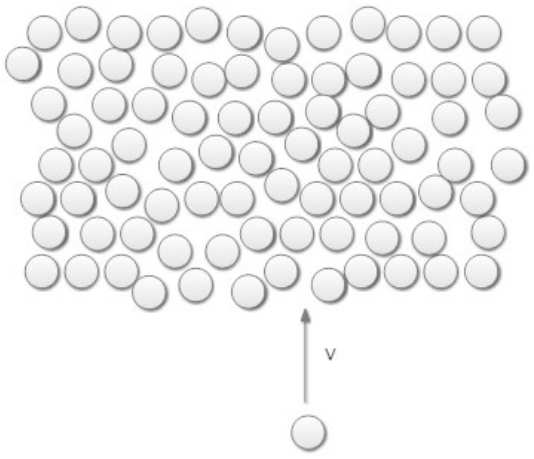

Figure 1: FTEP hits a bunch of FTEPs

Single FTEP has its momentum before it hits the wall made of other FTEPs a.k.a. Force Transfer Ether (FTE). Because FTEP momentum is a conserved quantity that wall must behave accordingly, meaning that its FTEPs must pass on the momentum.

Force Transfer Ether

FTEPs in FTE are randomly ordered, at the current moment from our perspective at least.

Definition 5. *FTE density*

$$n = \frac{Number\ of\ FTEPs}{Volume}$$

What can we say about FTE density? Is it the same through out our universe or does it vary from one location to another? It surely can vary, just by putting additional FTEPs into a volume its FTE density increases. How can we do that? We need a source of the additional FTEPs.

One such potential source could be a flux of FTEPs. If targeted at a specific volume it would increase the number of FTEPs in that volume. Sounds plausible, but what would generate such a flux of FTEPs in TOEBI? At least imaginary spherical object made of FTEPs moving inside FTE would generate FTEP flux. Faster the object moves faster those deflected FTEPs would move, but more importantly those displaced FTEPs would increase our FTE density, at least for momentarily.

Another plausible scenario could be a spinning spherical object which would gain its spinning from incoming FTEP vortex-like fluxes through its spinning axis poles. That kind of configuration would generate also the outgoing FTEP flux due to the conservation of momentum. This scenario would also provide us more manageable tool for increasing FTE density at will. FTE density gradient provides us also a vector field.

Particle

What is particle? What kind of an entity mainstream particle can be in TOEBI? Our building blocks are very limited, we only have FTEPs. And if we just put some FTEPs together we won't create very interactive systems, do we? It depends... how those FTEPs are put together. What kind of object or system made out of FTEPs generate more interesting and dynamic phenomena?

Let's start with a hypothesis that we have a spinning spherical object made out of FTEPs. It can for

example spread around possible incoming vortex-like FTEP fluxes on the poles of its spinning axis or it can function as blocking object for other colliding FTEPs.

Definition 6. *TOEBI particle refers to electron.*

Definition 7. *A_c is TOEBI particle (physical) area ejecting FTEPs towards another particle.*

A_c has a significant role in particle interactions, it functions as the ultimate stopping wall for the FTEPs ejected from other particles. It's also the thing at the core of TOEBI particle which generates particle's outwards FTEP flux properties.

Based on TOEBI we have two fundamentally relevant phenomena to play with.

- A_c and
- the speed of light c

Speed of Light

Measured fact is that c in a vacuum is the greatest achievable speed. But why is that? High velocities at particle scale in TOEBI happens on the surface of TOEBI particle's core, so the highest velocity (a.k.a. c) should emerge on the great circle perpendicular to the TOEBI particle spinning axis.

Postulate 2. *The equatorial speed on TOEBI particle is c.*

Photons are created next to TOEBI particles hence their velocity is capped to that c. More about photons and their properties later.

Particle Interactions

Interactions between TOEBI particles happens via FTEPs. What factors are involved with these interactions? Naturally the amount of delivered FTEPs and the momentum of those FTEPs matter. We don't know the exact amount (a.k.a. mass) of these ejected FTEPs but we do know (based on TOEBI's classical principals) that there is a certain area (m^2) which ejects these FTEPs to the speed of light.

Constant flow of the inwards FTEP flux (via spinning axis poles) gets converted to the outwards FTEP flux at the speed of light which is the greatest velocity on the surface of TOEBI particle. Also, due to the spherical geometry, delivered momemtum gets reduced according to the inverse squared law.

We define the force between two TOEBI particles as

First Law of TOEBI

$$\vec{F}_{1\leftarrow 2} = c^2 \frac{X}{r_{12}^2} \vec{e}_{12} \cos\alpha \, \frac{\mathrm{kg} * \mathrm{m}^2}{\mathrm{s}^2}$$

where X is the product of TOEBI particle cross section A_c and ejected FTEP mass, α is the angle between spinning vectors, r is the distance between the particles, $\vec{e}_{12} = \frac{\vec{r}_{12}}{r_{12}}$ is the unit vector pointing from particle 1 to particle 2 and c is the speed of light.

On the other hand

$$\vec{F}_{2\leftarrow 1} = c^2 \frac{X}{r_{12}^2} \vec{e}_{21} \cos\alpha \, \frac{\mathrm{kg} * \mathrm{m}^2}{\mathrm{s}^2}$$

applies, where $\vec{e}_{21} = \frac{\vec{r}_{21}}{r_{21}}$ is the unit vector pointing from particle 2 to particle 1.

At this point, when we are talking about two free TOEBI particles, angle α will be always π. More about α and its changes later.

Coulomb's Law

Based on Coulomb's law we can say

$$\vec{F}_{1\leftarrow 2} = \frac{1}{4\pi\epsilon_0} \frac{qQ}{r^2} = c^2 \frac{X}{r_{12}^2} \vec{e}_{12} \cos\pi$$

between two elementary TOEBI particles. Hence

$$X \approx 2.56696976 * 10^{-45} \, \mathrm{kg} * \mathrm{m}^2$$