Kinetics of an Energy Circulation in the Space Energy

From the Energy Circulation Theory:

➢ Movement of an intrinsic energy vests an additional energy.
➢ Antiparallel movements of energy form a circulation by the fundamental force working based on momentums.
➢ If we treat an energy circulation as stationary collectively, the total energy is quantized and works as the rest energy for its further movement.
➢ Linear movement of an energy circulation exhibits a helical movement of the intrinsic energy in the space energy (medium).
➢ Because it is a wave propagation in the medium, there is a special frame stationary to the space energy. The principle of relativity is no longer valid.

We derive Novel formulas for the equation of motion and kinetic energy.
< Energy circulation quantized in a Spacia >

➢ **Space energy** (energy of the vacuum space)
  - Spreads evenly in 3D surface of 4D sphere.
  - Can be expressed as circulations in one space dimension and one hidden H dimension of the lowest frequency $\omega_0$ among hidden dimensions.
  - Energy quantized within the radius $\mu_0$ of H. **Spacia**: 4D ball area of $\mu_0$

➢ **Apparent energy** (our observable energy)
  - Additional energy derived from movement (vibration) of the space energy.
  - Energy circulation by $(n)\omega_0$ with $\mu_0 \rightarrow$ quantized within a spacia

➢ Total energy of an energy circulation acts as the rest energy for any space direction. The rest mass $m_0$ is the intrinsic energy.

$$E_r = m_0 v_c^2 = m_0 \mu_0^2 \omega_0^2 = m_0 c^2$$ (quantized circulation in a spacia)
Take two particles of a common total energy \( E \).

1) Stationary particle  
2) Particle moving at \( v \) to the space energy

\[
E = m_0 c^2 \quad E = m_0 \left( v^2 + C_r^2 \right) \quad E = M_0 C_r^2
\]

By the \textit{stationary} frame  
By the \textit{co-moving} frame

\begin{align*}
\text{Intrinsic energy:} & \quad m_0 \quad m_0 \quad M_0 \\
\text{Velocity of IE:} & \quad c \quad c \quad C_r \\
\text{Circulating velocity:} & \quad c = \mu_0 \omega_0 \quad C_r \\
\end{align*}

\[ C_r^2 = c^2 - v^2 \]

\[ M_0 = \frac{m_0}{1 - v^2/c^2} \]
< Equation of motion >

Acceleration: (by stationary frame)  (by co-moving frame)

\[ v = 0: \quad \alpha_0 = \frac{dv}{dt} \]
\[ v = v_1: \quad \alpha_{v_1} = \frac{d(v_1 + v)}{dt} = \frac{dv}{dt} \quad \alpha_{v_1} = \frac{dV}{dt} = \frac{d(0 + v)}{dt} = \frac{dv}{dt} \]

For any value of \( v \), the acceleration is the same by the two frames.

\[ \alpha_v = \frac{dV}{dt} = \frac{dv}{dt} \]

Equation of motion by the co-moving frame - same force at \( v = v \) and \( v = 0 \):

\[ F = M_0 \alpha_v \quad , \quad F = m_0 \alpha_0 \quad (v = 0) \]
\[ \alpha_v = \frac{m_0}{M_0} \alpha_0 = (1 - v^2/c^2) \alpha_0 \]

by the stationary frame:

\[ F = \frac{m_0 \alpha_v}{1 - v^2/c^2} \]
Equation of Motion: \[ F = \frac{m_0 \alpha_v}{1 - v^2/c^2} = M_0 \alpha_v = m_0 \alpha_0 \]

Compared with the case of \( \alpha_0 \) at \( v = 0 \)

By the stationary frame: Acceleration is multiplied by the acceleration factor.

\[ \alpha_v = f_a \alpha_0 , \quad f_a \equiv 1 - v^2/c^2 \]

By the co-moving frame: Rest mass increases by \( 1/f_a \).

\[ M_0 = m_0 / f_a \]
Add $\Delta E$ to a stationary energy circulation (particle) and accelerate it to $v$.

$$E_r + \Delta E \rightarrow E_r + E_k = E_t$$

Affect a constant force $F$. The work $\Delta E$ is equal to the kinetic energy $E_k$.

$$E_k = \Delta E = \int_{x_0}^{x} F dx = \int_{0}^{v} F(v) dv = \int_{0}^{v} G(v) dv$$

$$\int F dx = \int m_0 \left( 1 - \frac{v^2}{c^2} \right)^{-1} \frac{dv}{dt} dx = \int m_0 \left( 1 - \frac{v^2}{c^2} \right)^{-1} v dv = \int m_0 T^{-1} v \frac{c^2}{-2v} dT$$

$$= - \frac{m_0 c^2}{2} \int T^{-1} dT = - \frac{m_0 c^2}{2} \log \left( 1 - \frac{v^2}{c^2} \right) + k$$

Take the definite integral from $v = 0$ (at $x_0$) to $v = v$ (at $x$).

$$E_k = - \frac{m_0 c^2}{2} \log \left( 1 - \frac{v^2}{c^2} \right)$$

$$E_k = \frac{1}{2} m_0 v^2 \left( 1 + \frac{1}{2} \frac{v^2}{c^2} + \frac{1}{3} \frac{v^4}{c^4} + \frac{1}{4} \frac{v^6}{c^6} + \cdots \right) = \frac{1}{2} m_0 v^2 \sum_{n=1}^{\infty} \frac{1}{n} \left( \frac{v^2}{c^2} \right)^{n-1}$$
New definition of the rest energy / rest mass:
\[ E_r \equiv E_t - E_k , \quad M_0 \equiv \frac{E_r}{C_r^2} \]

Rest energy/mass of an object orbiting in \( x \) with radius \( r \):
\[ E_t(r) = m_\infty c^2 + E_k(x) + E_p(r) \]
\[ E_r(r) = m_0(r)c^2 = E_t(r) - E_k(x) = m_\infty c^2 + E_p(r) \]
\[ m_0(r) = m_\infty + \frac{E_p(r)}{c^2} \]

Use a standard distance \( r_0 \).
\[ m_0(r) \approx m_0(r_0) + \frac{GMm_0(r_0)}{c^2} \left( \frac{1}{r_0} - \frac{1}{r} + \frac{GM}{2c^2} \left( \frac{1}{r_0} - \frac{1}{r} \right)^2 \right) \]

Rest mass on the earth \((h = r - r_0)\):
\[ m_0(h) \approx m_0(0) + \frac{GM_Em_0(0)}{c^2} \left( \frac{1}{r_0} - \frac{1}{r_0 + h} \right) \approx m_0(0) + \frac{m_0(0)gh}{c^2}, \quad \left( g = \frac{GM_E}{r_0} \right) \]
\[ E_r(h) = E_r(0) + \Delta E_p = m_0(h)c^2 \approx m_0(0)c^2 + m_0(0)gh \]

- The **total energy** of an atom is larger at a higher altitude than the ground level due to the **increase** of the **potential energy**.
- A **radiation frequency** of the atom at a higher altitude increases at the **same ratio** as that of the total energy.
- An **atomic clock** needs the adjustment of its clock frequency for one second by the altitude of its location.

Ref) Interpretation by the **general relativity**:

The change of clock frequency comes from the difference of the **gravitational redshift** by the height. They claim that the **time** at a higher altitude passes **faster** than that at a lower altitude **subject to the rest mass kept invariant**.