

Fundamentals of Energy Circulation Theory

Version-2025.01

Energy Circulation Theory (ECT):

Logical development from scratch
starting from the following two **premises**

Premises of ECT (axioms in mathematics):

(1) Energy E can be expressed as a motion (velocity v) of an **intrinsic energy** E_0 by

$$E = E_0 v^2 (= E_1 v_1^2 = E_2 v_2^2)$$

(E_0 and v vary by selection of target direction)

(2) Between two energies there works the **fundamental force** based on **momentums**. (Gravitational force acts on energy quantities.)

Force regulating the motion

Ancient astronomy :

Geocentrism: Celestial sphere, where stars are fixed, rotates around the earth, which is the center of cosmos.

Heliocentrism: Planets including the Earth revolve around the Sun.
The Earth rotates on its axis.

Neither theory assumes any force that determines the movement of celestial bodies, since they were considered as created by God.

Gravitational force and Equation of motion :

Kepler: Claimed (1) planets move in elliptical orbits with Sun as a focus, (2) should exist a **force regulating the motion of celestial bodies**.

Galileo: Discovered the **laws of free fall** (time of fall does not depend on the object's weight, fall distance is proportional to the

square of the time), and the **law of inertia**.

Newton: Formularized the **gravitational force** and the **equation of motion**.

Gravitational force eq. and Equation of motion (Newtonian mechanics):

- **Accurately demonstrated** the motion of celestial bodies in the **Solar system**.
- Gave the **logical basis** for the heliocentric theory.

Motion of fixed stars :

Standard physics : considers that only **gravitational force** controls the motion of stars.

ECT: insists that the motion of stars is controlled by the **fundamental force** working on momentums.

ECT successfully demonstrated the observed structures and motions of universe.

Neither black hole, dark energy, nor dark energy exists.

Standard physics cannot explain the structures of galaxies. It assumes a black hole at the center of galaxy and dark matter, but leaves too many serious open problems as unsolved.

The standard physics has gone in the **wrong direction** and become confused because they **did not know** the existence of the **fundamental force**.

What is the term “energy”?

Existing standard physics:

- Distinguish the **Energy** and the **Matter** (particle) while both are undefined.
- A particle and its antiparticle are generated by pair production from energy. By collision of a particle with its antiparticle, they return to energy (light) through pair annihilation. Since the number of particles was slightly higher than that of antiparticles, a particle-dominant universe lefts.

Speculations to the true figure :

- Energy is a continuum that shows vibrations in multiple dimensions?
- Vibration requires a medium and tension acting on it.
- Space of universe: the region where exists the energy acting as a medium
Additional energies by its vibrations: observable energies (light, particle)
- Force works between energies. Energy distribution in a circle = a particle.

Necessary to elucidate the **nature of energy** and the **force acting on it**.

Properties of energy

Define the term “**energy**” as “**what exists in the cosmos**”.

- Anything that exists should fall into energy.
- Distribution/motion of energy \Rightarrow other physical properties

Define energy first then others (reverse order of definitions)

Expected properties of energy:

- Energy is a continuum vibrating in multiple dimensions.
- Movement of energy vests an additional energy.
- Energy always in motion. Circulation gets in steady state \Rightarrow static particle

Premises that give these properties \Rightarrow

Main principles of the Energy Circulation Theory

- 1) Motion of an intrinsic energy E_0 at v shows the total energy $E = E_0 v^2$.
- 2) Between two energies a force works based on momentums (Fundamental force).

Intrinsic energy and Mass

- Intrinsic energy:** Energy divided by square of velocity in a target direction
- With selection of target direction: Velocity changes, total energy not change.
 - Intrinsic energy has a nature of mass.
 - **Mass** in narrow sense: defined as **intrinsic energies moving at light speed**

$$E = M_1 v_1^2 = M_2 v_2^2 = mc^2$$

- Momentum:** Defined by intrinsic energy and velocity $\mathbf{p} \equiv m\mathbf{v}$ ($E = Mv^2$, $E = pv$)
- Momentum varies by selection of intrinsic energy.
 - If selected intrinsic energies moving at a common velocity, momentums get proportional to energies.

Linearly moving energy circulation (particle):

<1D expression> Intrinsic energy M moves linearly at v : $E = Mv^2$

<3D expression> Intrinsic energy m moves **helically** at c : $E = mc^2$

Linear component: $E_L = mv^2$, $\mathbf{p}_L = m\mathbf{v}$

Circular component: $E_c = mC_r^2 = m(c^2 - v^2)$, $\mathbf{p}_c = m\mathbf{C}_r$

Total energy: $E = E_L + E_c = mv^2 + mC_r^2 = mc^2 = Mv^2$

Notation of energy distribution (location)

$E\psi$: **energy** E is distributed at **location** ψ

ψ : Function showing a location of energy. By selection of target direction, it varies. Common for any kinds of energy; $E\psi$, $m\psi$, $p\psi$ etc.

Linear motion: $\psi = vt$, $E = Mv^2$

Circular motion: $\psi = [x \ y] = \mu[\cos \omega t \ \sin \omega t] = \mu(\cos \omega t + i \sin \omega t)$ (μ : radius)
 $E = mv_c^2 = m\mu^2\omega^2$ (m : dispersed in whole circumference)

Helical motion: $\psi = jvt + \mu(\cos \omega_2 t + i \sin \omega_2 t)$
 $E = m(v^2 + C_r^2) = m(v^2 + \mu^2\omega_2^2)$

Elementary energy circulation (eEC) composing quantum particles (see later):

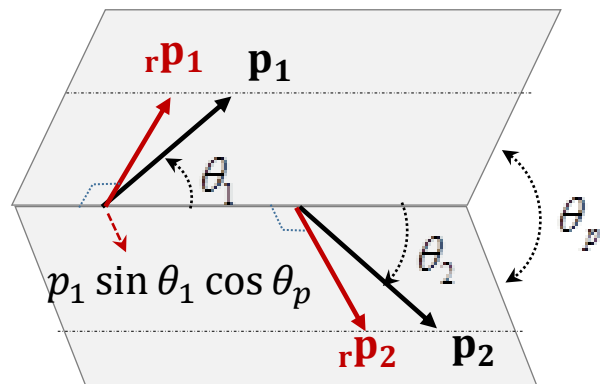
Apparent energy (vibration of space energy) having
minimum radius μ_0 , maximum velocity c

Static eEC: $\psi_0 = \mu_0(\cos \omega_0 t + i \sin \omega_0 t)$, $E = m_0\mu_0^2\omega_0^2 = m_0c^2$

Moving eEC: $\psi = jvt + \mu_0(\cos \omega t + i \sin \omega t)$
 $E = m_0c^2 = m_0(v^2 + C_r^2) = m_0(v^2 + \mu_0^2\omega^2)$

Fundamental force

- Between two energy movements, a one-dimensional force (referred to as the “**fundamental force**”) works based on momentums.
- Define the “**orthogonal momentum**” (or called “rest-energy momentum”) ${}_r\mathbf{p}$ as the component in the orthogonal direction to the distance direction. The force below works; plus is repulsive, minus is attractive.



$$F = K_f \frac{{}_r\mathbf{p}_1 \cdot {}_r\mathbf{p}_2}{d^2} = K_f \frac{p_1 p_2}{d^2} \cos \theta_p \sin \theta_1 \sin \theta_2$$

K_f : Fundamental force constant

- Antiparallel movements with v and $-v$ ($\theta_1 = \pi/2$, $\theta_2 = -\pi/2$ in a plane) bend and form a circulation. $v_c = v$, μ : radius, $d = 2\mu$, $E = mv_c^2$.

$$F = K_f \frac{p_1 p_2}{d^2} \sin \frac{\pi}{2} \sin \frac{-\pi}{2} = -K_f \frac{p_1 p_2}{4\mu^2} = -K_f \frac{E_1 E_2}{4v_c^2 \mu^2} = -K_f v_c^2 \frac{m_1 m_2}{4\mu^2}$$

Dependency of K_f on the speed of the intrinsic energy

- The total energy is invariant by selection of the intrinsic energy.

$$E = m_1 v_1^2 = m_2 v_2^2$$

- Movement differs depending on selection of the intrinsic energy. The momentum also differs by the selection, but the **fundamental force** should be **invariant**.
- K_f : **phase velocity in space energy = light speed c** is used as the common speed of intrinsic energies. Moving antiparallel energies at $\pm v$: expressed either as " M is moving linearly at $\pm v$ " or " m is moving helically at $\pm c$ ".

Linear momentums: $\pm Mv, \pm mv$ **Energy** is same: $Mv^2 = mc^2$

$K_f(v)$ for intrinsic energies moving at $\pm v$:

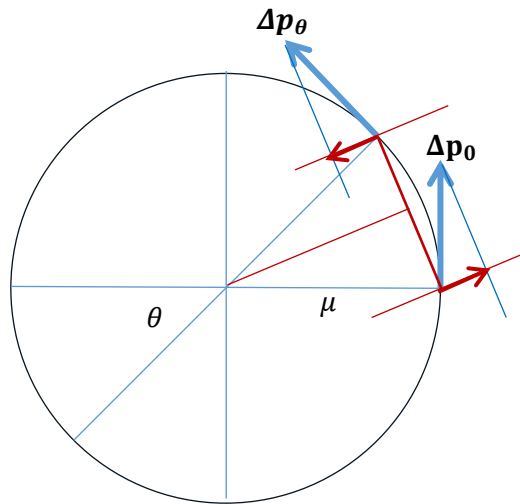
$$F = -K_f \frac{(mv)^2}{d^2} = -K_f(v) \frac{(Mv)^2}{d^2}$$

$$K_f(v) = \left(\frac{m}{M}\right)^2 K_f = \frac{v^4}{c^4} K_f$$

Intra-circulation force

In energy circulation $E\psi = E\mu(\cos \omega t + i \sin \omega t) = E\mu \exp(i\omega t)$:

- The below force works between two local energies ΔE_0 and ΔE_θ apart by a central angle θ . Magnitude: not depend on d, θ , decided only by μ (radius)



$$d = 2\mu \sin \frac{\theta}{2}$$

$$\Delta_r p_0 = \Delta p_0 \sin \frac{\theta}{2}$$

$$\Delta_r p_\theta = \Delta p_\theta \sin \frac{-\theta}{2}$$

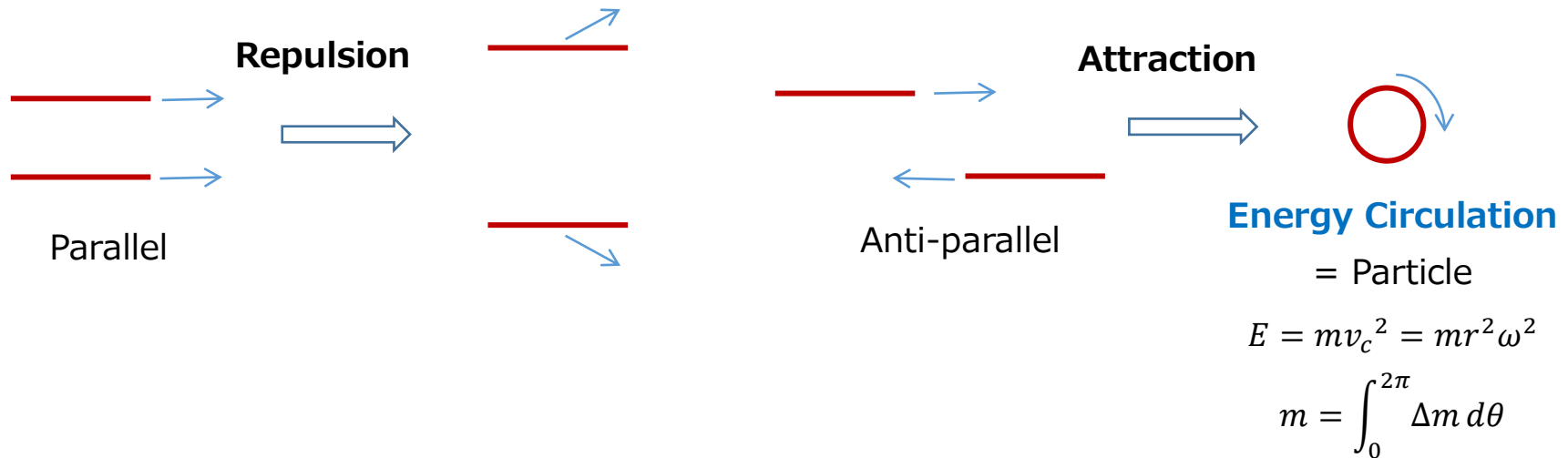
$$F = K_f \frac{\Delta p_0 \Delta p_\theta}{d^2} \sin \frac{\theta}{2} \sin \frac{-\theta}{2} = -K_f \frac{\Delta p_0 \Delta p_\theta}{4\mu^2}$$

- Sum of forces with the whole circumference for a local energy ΔE : results in centripetal (zero in tangential direction). ($v_c = \mu\omega$, $E = Mv_c^2$, $\Delta E = mv_c^2$)

$$cF_\perp = -K_f \frac{\Delta p_0}{4\mu^2} \int_0^{2\pi} \Delta p_\theta \sin \frac{\theta}{2} d\theta = -K_f \frac{\Delta p_0}{4\mu^2} \frac{4p}{2\pi} = -K_f \frac{p\Delta p_0}{2\pi\mu^2} = -K_f \frac{E\Delta E}{2\pi v_c^2 \mu^2} = -K_f v_c^2 \frac{Mm}{2\pi\mu^2}$$

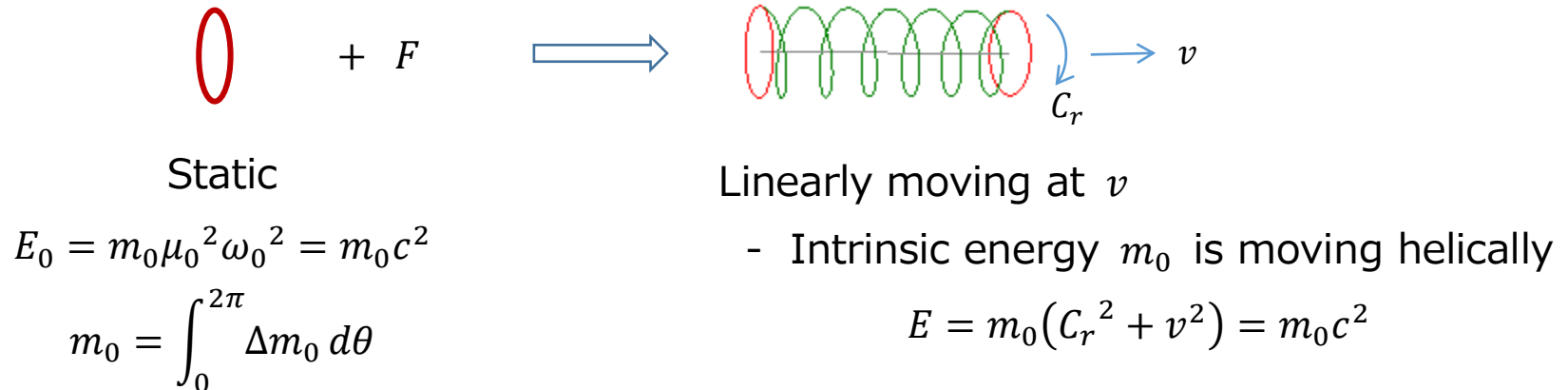
$$cF_{//} = -K_f \frac{p\Delta p}{4\mu^2} \int_0^{2\pi} \cos \frac{\theta}{2} d\theta = 0$$

Interaction of energy movements by the fundamental force



Elementary single energy circulation

μ_0 : minimum radius, ω_0 : maximum frequency, $c = \mu_0\omega_0$: light speed



Continued in subsequent sessions

Force between energy circulations: explained in “quantum particles”

Features derived from the energy circulation theory:

- Intra-circulation force controls the **space expansion** (not gravity).
- Cosmic energy: expanded in 4D, distributed in 3D surface of 4D sphere. Radial thickness: not increase - **hidden dimension**. 3D: **space dimension**
- Divide the cosmic energy to the symmetric part “**space energy**” and asymmetric part “**apparent energy**”. Apparent energy can be treated as a vibration of the space energy.
- As the space expands, the initial apparent energy separates and decomposes to **smaller circulations** in multiple rounds, providing galactic seeds, stellar seeds, and smallest energy circulations.
- Space energy in a unit area of μ_0 (radius of hidden D): called **spacia**. Smallest energy circulations have the same frequency ω_0 as spacia, and compose **quantum particles**.
- **Electric charge** is the momentum in hidden D of a hidden-space circulation.

Consequences from the ECT

Please visit the following site on the ECT:

[Energy Circulation Theory \(ECT\)](#)