Energy Balance

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What is What

Figure 1: Illustration of the tube and cork model showing symmetry between worlds

Figure 1 shows two rows of tubes and corks: I upper and II lower.

1 Energy Balance

[... reszta dokumentu bez zmian ...]

Notation and Interpretation Key

The following equations describe the **total energy balance**, accounting for both:

- **Available energy** – rest mass (mc^2), released as photons in annihilation processes, experimentally measured.
- **Trapped/inaccessible energy** – structural energy associated with space-time geometry, which **is not observable** in standard measurements and does not manifest as photons. This includes:

– $1E_{\text{vac}}$ – basic vacuum energy associated with the FST/ZST state

– E_{grav} – "deposit" energy required for changing geometric polarization

For clarity, **trapped energies are color-coded**:

- Basic vacuum energy
- Geometric deposit energy

It should be remembered that although they formally appear in equations, they represent an "accounting" record of energy flow to/from the vacuum "bank", not available energy.

Energy gradient context:

- The line on the table represents **global background vacuum energy** (CP4D), which has lower energy density than the polarized ZST state.
- A 1Gr coin ($1E_{\text{vac}}$) lying **above** the line symbolizes that energy in ZST(+) is **higher** than background energy – like a stream flowing downhill.
- A 1Gr coin ($1E_{\text{vac}}$) lying **below** the line symbolizes that energy in ZST(−) is **lower** than background energy – like a stream flowing upward.
- The process $P^{(+)} + P^{(-)} \to 0$ is **spontaneous** because it involves **gradient equalization** – "flow" of energy from higher to lower state until reaching the ground state (line).

1.1 Row I. Our Universe

The photo shows a tabletop with a thin but visible line drawn on it. We draw four dots on it labeled: 1, 2, 3, 4 – spaced about 50 mm apart. The line is an analog of our CP4D spacetime. Hidden in the line is global vacuum energy E_{gvac}. Above each dot we place a 1 grosz coin, but positioned so the coin's edge is slightly away from the line. The 1Gr coin symbolizes vacuum energy $1E_{\text{vac}}$ contained in both FST and ZST. FST is the state of flat, unraveled spacetime after unpacking it (depriving it of energy $E = mc^2$) from the tube. We'll describe the dots in detail, remembering that above each dot and the line lies a 1Gr coin.

1. A 5 złoty coin (5 zł) touches the 1Gr coin. It is placed above the 1Gr coin, touching it edge-to-edge. This configuration represents proton $P^{(+)}$. Inside the proton is contained compressed CP (ZST), which contains energy $E = mc^2 + 1E_{\text{vac}}$ (worth 1Gr). This corresponds to the photo of a tube with a red cork attached. On the cork lies $MP^{(+)}$, meaning the CP in the tube has polarization (+). Polarization (+) in the energy balance means that mc^2 lies above the line.

2. Above the dot lies a 1Gr coin, higher up – without contact – lies a 5 zł coin ($E = mc^2$), and even higher (also without edge contact) lies a 5 zł coin (E_{grav}). This configuration means we have unpacked proton $P^{(+)}$ into its components. This corresponds to PBlu-O (identical to FST($^+$) from photo 1) with two tubes beside it. It must be noted that we don't know the value of E_{grav} needed to flip the CP. This doesn't matter in our thought experiment; we assume E_{grav} is equivalent to 5 zł.

3. We have sequentially:

   (a) 3.1. One Gr above the line and above it a 5 zł ($E = mc^2$) not touching edges.

   (b) 3.2. Another 5 zł, i.e., E_{grav}, we place below the line, below the 1 Gr. This means the FST-type CP has flipped and is enriched by the value E_{grav} and $1E_{\text{vac}}$.

   Postulate 1. Energy used to flip CP polarization remains in it as vacuum energy. Applies to universes I and II. Energy $1E_{\text{vac}}$ moves with E_{grav}.

   This energy after unpacking $P^{(+)}$ supplies the background, i.e., CP4D. We now denote FST as FST($^{+2}$). This corresponds to the photo of the lid marked as PBlu-R (next to it stands a tube ready to contain the lid).

4. Above the dot lies 1Gr, below it (below the line) 5 zł (E_{grav}), and higher (above the line) another 5 zł ($E = mc^2$). The arrangement corresponds to the image of a tube with a green lid attached. On it lies $MP^{(-)}$, i.e., bottom side up. This is the analog of $aP^{(-)}$.

   In this model, the internal energy of $P^{(+)}$ and $aP^{(-)}$ is the same, because E_{grav} (upon decay of $aP^{(-)}$) will supply the vacuum energy and this is energy inaccessible to $aP^{(-)}$ as well as its twin $aP^{(+)}$.

1.2 Row II. The Universe on the Other Side of the Mirror

We describe similarly to I, what is what, emphasizing differences through bold and italic. We generally move below the line. 1Gr coins are placed below dots: 1–4 and do not touch the line with their edges.

1. A 5 złoty coin ($E = mc^2$) touches the 1Gr coin. It is placed **below** the 1Gr coin, touching it edge-to-edge. This configuration represents proton $P^{(-)}$. Inside the proton is contained compressed CP (ZST), which contains energy $E = -mc^2$. This corresponds to the photo of a tube with a red cork attached, bottom row. On the cork lies $MP^{(-)}$, meaning the CP in the tube has polarization $(-)$, which is equivalent to mc^2 lying *below the line*. The negative value of energy for mass follows from this being the only logical assumption for the entire picture and conclusions derived from it to be self-consistent and logical.

2. Below the dot lies a 1Gr coin, lower – without contact – lies a 5 zł coin (mc^2), and even lower (also without edge contact) lies a 5 zł coin (E_{grav}). This configuration means we have unpacked proton $P^{(-)}$ into its components. This corresponds to PBlu-R (identical to FST$^{(-)}$) with two tubes beside it. On PBlu-R lies $MP^{(-)}$, i.e., bottom side up.

3. We have sequentially:

   (a) 3.1. 1Gr above the line and below it (below the line) 5 zł (mc^2).

   (b) 3.2. Another 5 zł (E_{grav}) we place above the 1Gr (above the line). This means the FST-type CP has flipped and is enriched by the value E_{grav} and $1E_{\text{vac}}$. This energy supplies the single common background, i.e., CP4D. We denote FST as FST$^{(-2)}$. This corresponds to the photo of the lid marked as PBlu-R (next to it stands a tube ready to contain the PBlu-R lid).

Conclusions

1. Spacetime is the common background, the boundary on which both states manifest.

2. The meeting of $P^{(+)}$ and $P^{(-)}$ is not matter-antimatter annihilation, but **cancellation of opposite curvature**.

$$P^{(+)} + P^{(-)} = mc^2 + 1E_{\text{vac}} + (-mc^2) - 1E_{\text{vac}} = 0 \tag{1}$$

   Two opposite "bumps" mutually cancel each other. No energy release: This process summarily releases only flat, smooth, unpolarized spacetime (FST with polarization 0). No energy is released because this is not destruction, but merely **release of potential energy locked in geometry** – and this release is in a form that is not photon emission, but merely "smoothing" of spacetime. E_{grav} from both sides of the mirror also cancel each other, smoothing CP. This is not annihilation! This is **geometric neutralization**, which is an energy-less process. The reaction of $P^{(+)}$ with $P^{(-)}$ may resemble violent "unraveling" of spacetime.

3. Energy is not "contained" in matter, but is a geometric property of spacetime itself. Matter is only a temporary, polarized concentration of this energy.

4. In each of the worlds: I and II, the following occurs:

   Standard intra-world annihilation:

   - $P^{(+)}$ (from World I) + $aP^{(-)}$ (its antiproton from World I) → FST + energy (e.g., gamma photons).
   - $P^{(-)}$ (from World II) + $aP^{(+)}$ (its antiproton from World II) → FST + energy.

Let's write the corresponding reactions in the full balance (available + trapped):

$$c) \quad P^{(+)} + aP^{(-)} \to 2mc^2 + (1E_{\text{vac}} - 1E_{\text{vac}}) - E_{\text{grav}} = 2mc^2 - E_{\text{grav}} \quad (2)$$

$$d) \quad P^{(-)} + aP^{(+)} \to -2mc^2 + (-1E_{\text{vac}} + 1E_{\text{vac}}) + E_{\text{grav}} = -2mc^2 + E_{\text{grav}} \quad (3)$$

Interpretation:

- In reaction (c), **available energy** $2mc^2$ is released (registered as photons). Simultaneously:
  - $1E_{\text{vac}}$ energies cancel each other (return to ground state)
  - E_{grav} energy is returned to the global vacuum energy ("bank")

  Hence the **total** balance record accounts for this flow. In experimental measurement we observe only $2mc^2$.
- In reaction (d), negative **available energy** $-2mc^2$ is released. Simultaneously:
  - $1E_{\text{vac}}$ energies cancel each other
  - E_{grav} energy is "withdrawn" from the mirror world's vacuum energy

5. **New process: inter-world quasi-annihilation:**

- $P^{(+)}$ (from World I) + $P^{(-)}$ (from World II) $\to$ violent "extinguishing" (like destructive interference of two opposite wave phases).

6.1. **Scenario 1: Universe I (Ours) – "Heads Side of the Coin"**

- **Initial State (Big Bang):** Primordial, hot quark-gluon plasma. The "Background" (global spacetime) has gigantic, positive energy density.
- **Cooling Process:** The Universe expands and cools.
- **What happens to energy?** Energy "flows" from the background to quarks.
  - "Bare" quarks (with mass ~ 0 in this context) are "dressed" by the powerful gluon field.
  - Energy that was dispersed in the background becomes localized and trapped in hadrons (protons, neutrons) as $1E_{\text{vac}} + mc^2$.
- **Final State (Today):**
  - Background (vacuum): Has low, positive energy (perhaps the cosmological constant).
  - Matter (protons): Have high, positive energy/mass (~ 938 MeV) + $1E_{\text{vac}}$.

- **Balance:** $E_{\text{initial}}(\text{background}) > E_{\text{final}}(\text{background})$. The difference went into creating massive particles and their structural energy. Matter has positive energy.

6.2. **Scenario 2: Universe II (Mirror) – "Tails Side of the Coin"** This is a mirror reflection not only of space and charge, but also of the energetic process!

- **Initial State (Mirror Big Bang):** Primordial plasma. The "Background" has gigantic, negative energy density. (This is key!).
- **Cooling Process:** The Mirror Universe expands and **heats up**.
- **What happens to energy?** Energy "flows" from quarks to the background.
  - "Dressed" quarks start from a state of **less negative energy** and in the confinement process their energy becomes **more negative**.
  - The confinement process in world II is a process in which quarks transition to a state of **lower (more negative) energy**, and the energy difference is transferred to the surroundings, which become **less negative**.
- **Final State (Their "Today"):**
  - Background (mirror vacuum): Has low, negative energy.
  - Matter (protons $P^{(-)}$): Have high (absolute value), negative energy/mass (~ -938 MeV) + $-1E_{\text{vac}}$. For them, this is the normal state – their "positiveness".
- **Balance:** $E_{\text{initial}}(\text{background}) < E_{\text{final}}(\text{background})$ (both negative, so absolute value decreases). The difference came from quarks, which became "lighter" (more negative), and the background became less negative. Matter has negative energy.