

# A Tale of Deep Symmetry in the World

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## Abstract

This tale is an attempt to see the invisible. Using simple objects - cardboard tubes, colored corks, and plastic lids - we create a map to understand the deepest symmetries governing our Universe. We tell a story about how matter and antimatter may be merely two sides of the same coin, how energy is encoded in geometry, and why our world, despite this perfect symmetry, seems to break free from it.



Figure 1: Illustration of the model with tubes and corks. Red cork (KRed) symbolizes positive charge, green cork (KGren) - negative charge. Paper tube (TP) represents rest energy, crushed paper (ZKP) - polarized spacetime. Small lid (MP) represents the geometric polarization of spacetime. Full description of all elements can be found in the document [Analogia.pdf](#).

## 1 Proton: Not Just a Particle

Let's imagine a proton. In the standard picture, it's a tiny ball carrying a positive charge. But to go deeper, we must "disassemble" it into its fundamental parts. In our story, a proton is not a single entity, but rather a **complex state of fundamental reality**.

Let's introduce our actors:

- **Paper Tube (TP)**: This is pure rest energy,  $E = m_p c^2$ . It is the fuel, the raw material from which matter is built.
- **Crushed Paper Sheet (ZKP)**: This is **curved and polarized spacetime**. Its specific "shape" or "polarization" - which we denote as **ZKP(+)** - is what manifests to us as positive charge and other proton properties.
- **Red Cork (KRed)**: This is just a **marker**, a label. It symbolizes positive charge, which is the **effect** of the hidden, geometric nature of ZKP(+), not its cause.

Our proton is therefore: **P(+)** = **[KRed]** + **[TP]** + **[ZKP(+)]**. It is energy ( $E = mc^2$ ) trapped in a specifically twisted region of spacetime, labeled with "+".

## 2 In Gravity's Workshop: Unpacking and Flipping

Gravity is the great architect and destroyer. In extreme conditions - in the hearts of dying stars or at the threshold of black holes - its power reaches absurd levels. It provides the energy (**E\_grav**) needed to "unpack" the proton.

### The Flipping Process

#### Step 1: Unfolding

Extreme gravity provides energy to unfold the proton's compressed spacetime.

$$P(+) = [KRed] + [TP] + [ZKP(+)] \rightarrow [PBlu-O] + m_p c^2 + E_{grav}$$

Where **PBlu-O** is a large blue lid symbolizing the unfolded, fundamental spacetime (RKP). The mass energy ( $m_p c^2$ ) is released, ready for reuse.

#### Step 2: Inversion (Flipping the Coin)

Part of the gravitational energy ( $E_{grav}$ ) goes into performing work - **flipping** the geometric state. This is a crucial, non-intuitive step. Adding a second "positive" polarization (**MP(+)**) to an existing one does not strengthen it, but rather **overloads** the system, causing it to "flip" to the opposite state.

$$MP(+) + MP(+) = MP(-) \quad \text{or equivalently} \quad MP(+) + E_{grav} = MP(-)$$

The geometry has been **flipped**.

#### Step 3: Re-compression

The previously released mass energy ( $m_p c^2$ ) is now used to re-"crush" the already **flipped** spacetime (with polarization **MP(-)**) back into condensed form **ZKP(-)**. A new object is created. Since its internal geometry now has negative polarization, we mark it with a **green cork (KGren)** - a symbolic indicator of negative charge.

$$[PBlu-O] + [MP(-)] + m_p c^2 \rightarrow [TP] + [ZKP(-)] + [KGren] \equiv aP(-)$$

The birth of an antiproton.

Nothing is lost in this process. Energy is conserved. Only the **geometric state** of the fundamental "substance" of the world changes, and this change brings with it a change of label (cork).

### 3 Two Worlds: The Mirror Reflection of Reality

The true elegance of this story reveals itself when we look at the bigger picture. Our model allows us to construct not one, but **two symmetric universes**.

#### Row I: Our Universe

- **KRed** = Marker of **Positive** Charge (+)
- **KGren** = Marker of **Negative** Charge (-)
- **P(+)** = [KRed] + [TP] + [ZKP(+)] (Our proton)
- **aP(-)** = [KGren] + [TP] + [ZKP(-)] (Our antiproton)

#### Row II: The Mirror Universe

- **KRed** = Marker of **Negative** Charge (-) (**Change!**)
- **KGren** = Marker of **Positive** Charge (+) (**Change!**)
- **P(-)** = [KRed] + [TP] + [ZKP(-)] (Mirror proton)
- **aP(+)** = [KGren] + [TP] + [ZKP(+)] (Mirror antiproton)

In this world, **geometric polarization defines matter differently**. What is matter to us (ZKP(+)), there - due to changed conventions (corks) - manifests as **antimatter** (aP(+)).

And here we come to a breathtaking point:

**The proton (P(+)) from our Universe is *identical* to the antiproton (aP(+)) from the Mirror Universe.**

**The mirror proton (P(-)) from that Universe is *identical* to the antiproton (aP(-)) from ours.**

We have just discovered **CPT** - the deepest symmetry of nature. The simultaneous transformation of:

- **C (charge)** - by changing the meaning of corks,
- **P (parity)** - by inverting the geometric polarization (MP),
- **T (time)** - implicitly, by comparing two persistent states,

leads to a world that is **indistinguishable** from the original! The physical laws describing a proton in our world are **identical** to those describing a mirror antiproton in that world.

## 4 The Moral of the Story: Symmetry and Its Breaking

Our story about tubes and corks reveals something beautiful: the fundamental architecture of reality appears to be perfectly symmetric. Matter and antimatter are merely a matter of perspective, convention, the "setting" of our local geometry and labels.

But it also presents us with the greatest puzzle: **If this symmetry is so perfect, why does our universe seem to be built almost exclusively from matter?**

Why does our reality resemble mainly **Row I**, and not a mixture of I and II? Where did the antimatter go? This question remains the greatest unsolved riddle of modern cosmology. Our model does not provide an answer, but it gives us a **language** and an **image** to think about it beautifully and deeply.

It shows that we are searching not for something that "destroyed" antimatter, but rather for a **vanishingly small asymmetry** in the laws of physics, a tiny "gremlin" in the flipping process that slightly favored the formation of geometric states of type **ZKP(+)** over **ZKP(-)** in the first fractions of a second after the Big Bang.

This story is not the end. It is an invitation to further exploration. An invitation to look at a simple set of objects and see in them the reflection of the deepest laws of the cosmos.