On the Six Fasteners of Spacetime: A Story About the Geometric Origins of Natural Forces

Arkadiusz Okupski

September 25, 2025

Abstract

This paper presents a philosophical-physical hypothesis using an analogy of simple everyday objects – cardboard tubes, colored corks, and plastic lids – to visualize the fundamental forces governing the Universe. The presented metaphor serves to illustrate the geometric nature of matter and spacetime and the origins of interactions between them.

Prologue: Objects That Speak of the Universe

Ordinary objects lie on the table: cardboard tubes, colored corks, plastic lids. To some, they are just objects. To others, they become a window into the deepest mysteries of reality. This story is an invitation to look through that window.

Figure 1: The Alphabet of a New Language

When the red lid rests on its base (rim facing up, coin showing Heads) – we have CP polarization of type Z2(+), denoted as Pred-O. When the lid is upside down (coin showing Tails) – we get the designation Pred-R. The lids serve to visualize the CP polarization for Z2, becoming signs in our new alphabet.

Fastener Z2: When Spacetime Embraces Matter

First Postulate: Interaction is a Change in Geometry

Every fundamental interaction is associated with a change in the metric of spacetime. Matter adheres to spacetime (CP) through "fasteners" (Z). When I use the word "matter,"

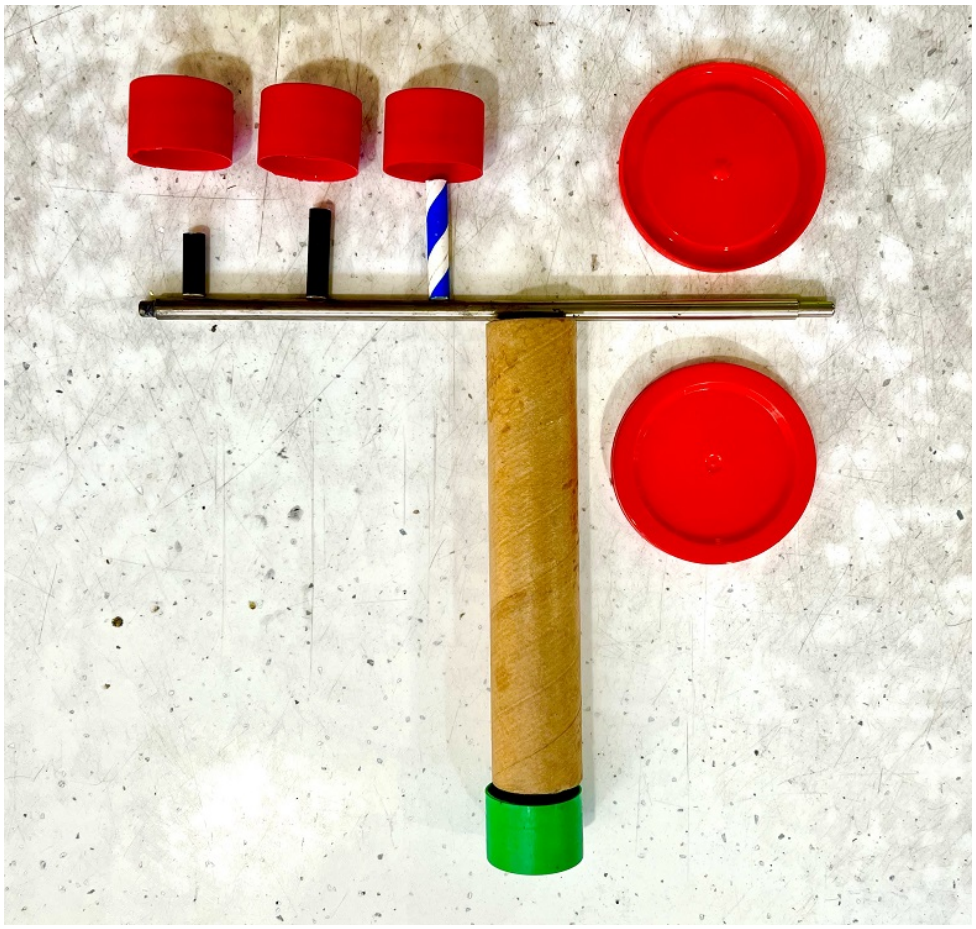

Figure 1: Illustration of the model with tubes and corks. The small red cork (KRed) symbolizes a positive charge Z2(+), and the green one (KGren) – a negative charge, i.e., Z2(-). The paper tubes (TP) represent the depth of the metric change in CP for Z2. The red lid (PRed) symbolizes the polarization of the CP geometry for Z2.

I think of both matter and antimatter – because at this level, they are one.

Second Postulate: The Unity of Foundations

Matter and CP are fundamentally one at the most basic level. Matter is compressed CP, like a folded sheet of paper (ZKP). Matter can straighten out gradually or completely, into smooth and flat CP. Similarly, we can unfold ZKP into a straightened sheet of paper (RKP). This straightening releases energy – the very energy that lies dormant in the equation $E = mc^2$.

Third Postulate: The Six Colors of Reality

We have six different changes in CP geometry that can occur together: Z1CP-Z1CP, Z2CP-Z2CP, up to Z6CP-Z6CP. I assign a color to each geometry: Z1 → blue (B), Z2 → red (R), Z3 → yellow (Y), Z4 → green (G), Z5 → white (W), Z6 → black (K).

We live in a three-dimensional world, and a color can represent anything – another dimension we cannot imagine. This is why I introduce colors into CP geometry. It is my way of describing the invisible.

A Journey Along the Rod: From Casimir to the Nuclear Force

A thin rod lies on the table. It symbolizes CP that is smooth and straightened for the Z2 geometry. From above (the Heads side), it is touched by four tubes: 1, 2, 3, 4. The first three have a diameter of 5 mm and lengths of 15 mm, 20 mm, and 25 mm, respectively. The fourth tube has a diameter of 32 mm and a length of 250 mm. A small red cork lies above each tube. Slightly to the right lies PRed-O.

Under the rod, to the right of tube 3, lies the same tube No. 4 (the large one), also touching the rod. Next to it lies PRed-R.

We begin our journey to the right along the rod, from tube 1 to tube 4.

First Station: An Almost Empty World

We are above tube 1 (15 mm). Matter is almost empty, its average density is, for example, $2000\,\mathrm{kg\,m^{-3}}$. The Z2 fasteners are very sparsely distributed. The Z2 metric for tube 1 is weakly polarized – barely bent, strained, twisted. Its value is symbolized by the short tube. This is the world of the Casimir force – weak, barely noticeable.

Second and Third Stations: Condensation

We move to the right, we are above tube 2 (length 20 mm). The mass has a higher density, the Z2 fasteners are closer together, there are more of them – the Casimir force increases. We draw similar conclusions above tube 3. The system slowly tenses up.

Fourth Station: The Critical Point

We move further to the right and matter reaches the critical density. The Z2CP-Z2M fasteners are practically side by side. And then something extraordinary happens.

Tube 4 undergoes a sudden elongation. The drawing does not convey the scale – it should be not 250 mm long, but 250 kilometers, or perhaps even more. A small change in density caused a sudden and explosive change in the Z2 metric of spacetime. This was not an explosion in space – the CP geometry itself "imploded," transitioning into a new state.

At this moment, the Casimir force transforms into the strong nuclear force.

Conclusions: Geometry as the Key to Reality

The journey along the rod reveals several fundamental truths about the nature of reality to us. Here are the conclusions that emerge from our story about the Z2 fastener:

1. Unification of Scales: From a Delicate Touch to a Nuclear Embrace

The Z2 mechanism provides an elegant explanation for a great puzzle of physics: why does the same interaction manifest so differently at different scales? The answer lies not in the nature of the interaction, but in the *density of the configuration* of the fasteners.

When Z2 are scattered – we experience the delicate attraction of Casimir, a barely perceptible touch of spacetime. When they condense beyond a critical threshold – the same mechanism transforms into a powerful embrace that binds atomic nuclei. These are not different forces – they are different intensities of the same geometric dialogue between matter and spacetime.

2. Geometry as the Source of Energy: Where does $E = mc^2$ Come From?

The violent elongation of "tube 4" is more than just a metaphor – it is the key to understanding the most famous equation in physics. The energy $E = mc^2$ is not an abstract quantity but real energy stored in the geometric strain of spacetime.

When matter formed in the early Universe, spacetime was "crushed," and the energy of this crushing became trapped within it. The strong interaction is the process of gradually releasing this stored geometric energy – like a spring decompressing, returning to its original shape over billions of years.

3. Phase Transition: The Catastrophe That Builds the World

The abrupt change between the state of "tube 3" and "tube 4" shows that the transition from the Casimir force to the strong interaction is not smooth. It is a *catastrophe* in the mathematical sense – a violent reorganization of the ground state of spacetime.

This geometric "overturning" of the system explains the existence of the "hard core" in the nuclear potential – it is the effect of a rebound after crossing the critical point. The atomic world is not gentle – it is born in geometric convulsions.

4. An Invitation for Further Journey: The Five Remaining Colors

The effectiveness of the Z2 model in describing the Casimir → Strong transition opens the door to further discoveries. Five other fasteners remain – five other colors in our geometric palette.

Does Z1 tell the story of gravity? Does Z3 hide the secrets of the weak interactions? Could one of the fasteners be responsible for dark energy? Each of these interactions could be another manifestation of the geometric transformations of spacetime, revealing themselves at different energy densities.

Epilogue: Return to the Table with Objects

When I now look at the cardboard tubes and colored corks on the table, I see something more than just objects. I see an alphabet with which the Universe tells its story. A story about how geometry becomes matter, how space collapses into particles, how the touch of spacetime transforms into fundamental forces.

This story does not end with the final sentence. Just as tube 4 elongates beyond the scale of our imagination, so does this story invite further exploration. Perhaps one day, when we understand all six fasteners, we will discover the deepest symmetry – the one that connects the geometric language of spacetime with the dance of elementary particles.

And it all started with looking at ordinary objects through the eyes of a child who still asks "why?".