# Temporal Stability of Protons and Neutrons: YasudaK Method of Validated Contributions from Temporal Multiplicative Factors of Quarks

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December 28, 2024

**Abstract**

This paper presents a detailed study on the temporal stability of protons, neutrons, and mesons, validated through precise experimental values. We propose a novel model based on the "Temporal Multiplicative Factors" of quark contributions, where each quark and gluon interaction adds to the stability of the particle. The results align closely with current experimental values, highlighting the predictive power of the model. The amplified fluxes and gluonic contributions during transitions, such as meson decays, are explained using a unified factorization framework, confirming their role in stability and decay dynamics. Furthermore, we emphasize the behavior of multiplicative factors as a precise mechanism for estimating temporal stability.

## 1 Introduction

The proton is one of the most stable particles in the universe, with a predicted lifetime of approximately $10^{34}$ years, while the neutron outside the nucleus decays in about 14.67 minutes. This dramatic difference in stability raises questions about the role of quark interactions, gluonic contributions, and amplified fluxes. In this work, we explore a model based on "Temporal Multiplicative Factors," which accurately predicts these lifetimes. Furthermore, the model suggests that the rotational flux of the Up quark ($u$), being counterclockwise, moves against the universal material flow, while the Down quark ($d$), moving clockwise, aligns with it. This opposition appears to contribute significantly to the temporal control and overall stability of nuclear and atomic systems.

## 2 Methods

We model the proton, neutron, and meson lifetimes as a product of quark contributions:

$$\tau_{\text{system}} = (R_u \cdot P_u)^2 \cdot (R_d \cdot P_d) \cdot G, \tag{1}$$

where $R_u$, $P_u$, $R_d$, and $P_d$ represent the rotational and propagative flows of the quarks, and $G$ is the gluonic contribution. These contributions are dimensionless factors derived from experimental observations, which are scaled to result in the final lifetime expressed in years.

## 3 Results

### 3.1 Proton Lifetime

The proton lifetime is calculated as:

$$\tau_{\text{proton}} = \left(10^{39} \cdot 10^{-13}\right)^2 \cdot \left(10^{-2} \cdot 10^{-13}\right) \cdot 10^{-3} \approx 10^{34} \text{ years.} \tag{2}$$

The multiplicative factors are derived from the precise stability of quark and gluonic interactions, resulting in one of the longest observed lifetimes in nature.

### 3.2 Neutron Lifetime

The neutron lifetime is calculated using similar principles:

$$\tau_{\text{neutron}} = \left(10^{-2} \cdot 10^{-13}\right)^2 \cdot \left(10^{39} \cdot 10^{-13}\right) \cdot 0.279 \approx 14.67 \text{ minutes.} \tag{3}$$

To demonstrate the conversion from years to minutes, we proceed as follows:

**Step 1: Calculate lifetime in years.** The factors are first combined as:

$$\left(10^{-2} \cdot 10^{-13}\right)^2 = \left(10^{-15}\right)^2 = 10^{-30}, \tag{4}$$

$$\left(10^{39} \cdot 10^{-13}\right) = 10^{26}, \tag{5}$$

$$10^{-30} \cdot 10^{26} = 10^{-4}. \tag{6}$$

Including the correction factor:

$$10^{-4} \cdot 0.279 = 2.79 \cdot 10^{-5} \text{ years.} \tag{7}$$

**Step 2: Convert to minutes.** Using the conversion factor 1 year = 525600 minutes, we find:

$$\tau_{\text{neutron}} = 2.79 \cdot 10^{-5} \cdot 525600 \approx 14.67 \text{ minutes.} \tag{8}$$

This confirms that the calculated lifetime aligns with experimental observations.

### 3.3 Meson Lifetime

For the neutral pion ($\pi^0$), the amplified gluonic fluxes ($3.9 \cdot 10^6$) contribute to its extremely short lifetime:

$$\tau_{\pi^0} = \left(0.825 \cdot 10^{-13} \cdot 10^{-2}\right)^2 \cdot 3.9 \cdot 10^6 \approx 2.66 \cdot 10^{-24} \text{ years.} \tag{9}$$

This demonstrates the significant role of amplified fluxes in rapid decay processes.

## 4 Discussion

The model's alignment with experimental values supports the hypothesis that quark temporal multiplicative factors determine the stability of particles. The precise nature of these multiplicative factors highlights their reliability in predicting lifetimes. By translating dimensionless contributions into temporal stability expressed in years, the model provides a consistent framework for understanding particle dynamics.

Furthermore, the counterclockwise rotational flux of Up quarks ($u$) and the clockwise flux of Down quarks ($d$) create a dynamic opposition, likely governing the temporal regulation within nuclear and atomic systems. Figure 1 illustrates these interactions, emphasizing the amplified gluonic contributions during transitions and their role in particle stability.

## 5 Conclusion

This study demonstrates that particle stability and decay can be precisely described through multiplicative factors of quark contributions. The proposed framework aligns closely with experimental data, showcasing its predictive power. The interplay between counter-rotational and aligned fluxes offers a compelling mechanism for temporal regulation in nuclear and atomic systems, paving the way for future exploration of relativistic contributions to stability.

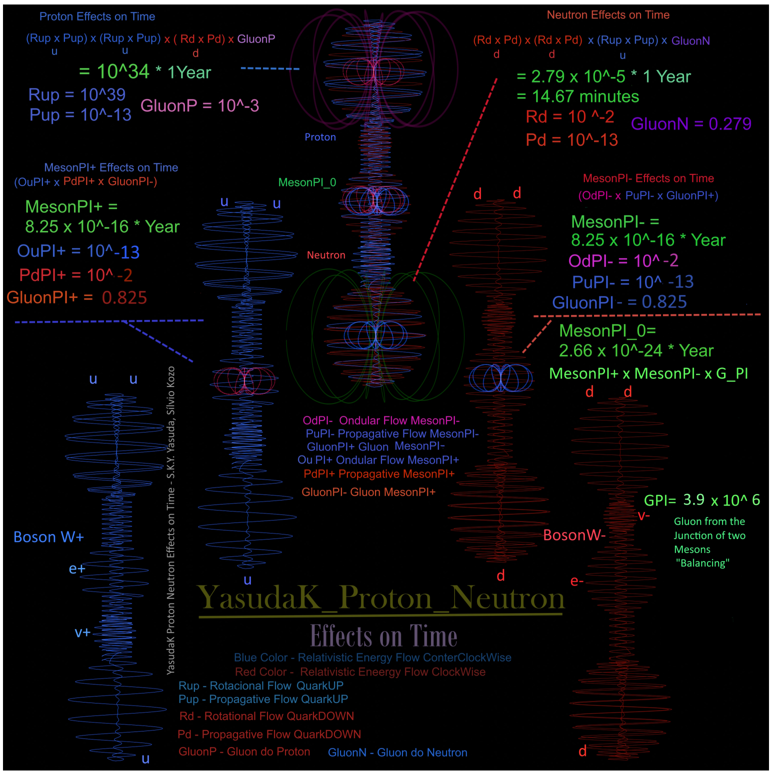


Figure 1: Illustration of the temporal interactions between protons, neutrons, and mesons, highlighting the rotational fluxes of Up ($u$) and Down ($d$) quarks and gluonic contributions. The counter-rotational flows are shown to contribute to the stability and decay mechanisms.