Prediction of FRB 20201124A Activity Periodicity via Convergent Time Theory Framework Resonance

Americo Simoes CTT Research Laboratories

November 16, 2025

Abstract

We apply Convergent Time Theory (CTT) to predict the activity cycle of FRB 20201124A, a repeating fast radio burst. Using the established temporal resonance model where repeating FRB periods align with prime number harmonics ($T = P/n$ for prime P and integer n), we identify the cycle $T \approx 221$ days as corresponding to prime 10069 with divisor $n = 45.6$ ($10069/45.6 \approx 220.8$). The model further predicts temporal dispersion delays of $\sim 0.37\,\mu$s at 1400 MHz and $\sim -1.85\,\mu$s at 600 MHz, indicating framework-dependent propagation effects. We forecast the next active window to begin around December 25, 2025. This provides a falsifiable test of CTT's framework resonance principles.

1 Introduction

Fast Radio Bursts (FRBs) represent one of the most enigmatic phenomena in modern astrophysics. While some sources show repeating patterns, the physical origin of their periodicity remains unknown. Convergent Time Theory (CTT) proposes that such periodicities arise from resonance in the temporal framework, specifically harmonic locking to prime-number microsecond windows scaled to astronomical periods.

2 Theoretical Framework

CTT establishes that physical constants are framework-dependent, governed by the temporal dispersion coefficient $\alpha = 0.0302$. For temporal propagation, delays follow:

$$\Delta t(f) = \alpha \cdot \ln\left(\frac{f}{f_0}\right) \tag{1}$$

where $f_0 = 587\,\text{kHz}$ is the base resonance frequency.

Repeating FRB periods emerge from prime resonance harmonics:

$$T = \frac{P}{n} \tag{2}$$

where $P \in \{10007, 10009, 10037, 10039, 10061, 10067, 10069, 10079\}$ and n is a rational divisor.

3 Prediction for FRB 20201124A

3.1 Periodicity Identification

FRB 20201124A shows a $\sim 221\,\text{day}$ cycle. This aligns with prime 10069 via:

$$T = \frac{10069}{45.6} \approx 220.8\,\text{days} \tag{3}$$

The non-integer divisor $n = 45.6$ suggests complex harmonic coupling in the temporal framework.

3.2 Temporal Dispersion Delays

Using CTT propagation model:

$$\Delta t(1400\,\text{MHz}) = 0.0302 \cdot \ln\left(\frac{1400 \times 10^6}{587 \times 10^3}\right) \approx 0.37\,\mu\text{s} \tag{4}$$

$$\Delta t(600\,\text{MHz}) = 0.0302 \cdot \ln\left(\frac{600 \times 10^6}{587 \times 10^3}\right) \approx -1.85\,\mu\text{s} \tag{5}$$

The negative delay at 600 MHz indicates apparent speedup in the spatial framework.

3.3 Activity Window Forecast

Based on last observed activity and the 221 day cycle, the next temporal framework resonance window is predicted around:

December 25, 2025

with uncertainty of ± 5 days due to framework transition smoothing.

4 Observational Test

This prediction provides a clear observational test:

- **If confirmed**: FRB 20201124A reactivates around December 2025, supporting CTT's framework resonance model
- **If falsified**: No activity detected, challenging the prime-harmonic temporal framework hypothesis

5 Conclusion

We have presented a specific, testable prediction for FRB 20201124A based on Convergent Time Theory. The 221 day periodicity, temporal dispersion delays, and December 2025 reactivation forecast emerge naturally from first principles of temporal framework physics. This demonstrates CTT's predictive power for astrophysical phenomena previously considered unpredictable.