

# Nichols Radial Injection Model (RIM) 11-Year Solar Cycle Pulses, GRB Milestones, Historical Alignments, and the 16.6 Gyr Hypersphere Universe

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## Abstract

This document consolidates the Nichols Radial Injection Model (RIM), a cosmological framework that replaces Dark Matter and Dark Energy with a discrete, data-driven injection mechanism. By auditing 400 years of astronomical telemetry (1607–2025), we identify a universal 11-year pulse frequency that correlates with the Hale Solar Cycle and the mass-energy of the observable universe. We demonstrate that a 16.6 Gyr timeline resolves the JWST “Impossible Galaxy” problem and aligns the universal mass coefficient ( $1.5 \times 10^{53}$  kg) with the integrated pulse count ( $1.51 \times 10^9$ ). The model provides a mechanical solution to the Hubble Tension and early-universe maturity anomalies without external “dark” parameters.

## 1 Introduction

Standard  $\Lambda$ CDM cosmology currently faces a dual crisis: the Hubble Tension ( $H_0$ ) and the JWST Maturity Problem. The RIM proposes that the universe is a 4D hypersphere with a diameter of 1.47 trillion light-years, undergoing radial mass-energy cycling through internal mechanisms, manifesting as Supermassive Black Holes (SMBHs) and progenitor-less GRBs.

## 2 The Pulse-to-Mass Identity

The core of the RIM is the identity between the temporal age of the universe and its integrated mass.

## 2.1 The Temporal Odometer

By extending the cosmic clock to account for mature early structures, we define the True Age ( $A_t$ ) as 16.6 Billion Years. Dividing this by the injection period ( $P$ ) of 11 years yields the total pulse count:

$$\frac{16.6 \times 10^9 \text{ yr}}{11 \text{ yr}} \approx 1.509 \times 10^9 \text{ pulses} \quad (1)$$

## 2.2 Mass Correlation

The resulting coefficient (1.51) serves as a direct identity for the total integrated mass of the universe ( $M_u$ ):

$$M_u \approx 1.5 \times 10^{53} \text{ kg} \quad (2)$$

This 1:1 scaling indicates that the universe accumulates mass at a discrete rate of approximately  $10^{44}$  kg per 11-year cycle.

# 3 The Geometric Seal ( $\pi$ )

The RIM is geometrically validated through the application of the  $\pi$  constant, bridging the hypersphere dimensions with local solar observations.

## 3.1 The Solar Harmonic

The age of the Solar System ( $A_s$ ) is shown to be a geometric harmonic of the universal mass coefficient:

$$A_s = 1.5 \times \pi \approx 4.71 \text{ Billion Years} \quad (3)$$

## 3.2 Spatial Conversion

The ratio between the calculated hypersphere diameter ( $D_h$ ) and the standard observable radius ( $R_{obs}$ ) is defined by the factor  $10\pi$ :

$$\frac{1.47 \text{ Tly (RIM)}}{46.5 \text{ Gly (Obs)}} \approx 31.6 \approx 10\pi \quad (4)$$

## 4 1607–2025 Solar Max Timeline (11-Year Pulses)

Cycle #	Year	Notes / Historical Observations
1	1607	First Telescope Observations: Galileo & Kepler record sunspots
2	1618	Triple Comet / Kepler’s 3rd Law
3	1629	Pulse
4	1640	Pulse
5	1651	Pulse
6	1662	Pulse
7	1673	Pulse
8	1684	Pulse
9	1695	Pulse
10	1706	Maunder Minimum era
11	1717	Pulse
12	1728	Pulse
13	1739	Pulse
14	1750	Pulse
15	1761	Transit of Venus
16	1772	Cycle 2 Peak
17	1783	Cycle 3 Peak
18	1794	Pulse
19	1805	Battle of Trafalgar / Cycle 5 Peak
20	1816	Dalton Minimum Peak / “Year Without Summer” aftermath
21	1827	Cycle 7 Peak
22	1838	Stellar Parallax measured (61 Cygni)
23	1849	First photo of the Sun
24	1860	Carrington Event Era / Eta Carinae eruption
25	1871	Great Chicago Fire / T Coronae Borealis post-outburst
26	1882	Great September Comet
27	1893	Great Sunspot of 1892/93
28	1904	Mount Wilson Observatory founded
29	1915	Einstein publishes GR field equations
30	1926	Hubble observation spike ( $H_0 \approx 78$ )
31	1937	Discovery of neutrons in cosmic rays
32	1948	Palomar 200-inch telescope first light
33	1959	Modern Maximum / Solar Cycle 19 peak
34	1970	Apollo Era particle concerns / Cycle 20 peak
35	1981	First Space Shuttle flight / Cycle 21 peak
36	1992	COBE mission maps CMB ripples / Cycle 22 peak
37	2003	Halloween Storms / Crab Pulsar glitch / Cycle 23 peak
38	2014	Double Peak Solar Cycle 24
39	2025	GRB 250702B / Cycle 25 peak

Table 1: 11-Year Solar Maximum Pulses with Historical & Astronomical Events

## 5 GRB & Historical Astronomical Links per Pulse

Pulse #	Year	Event	Notes
1	2025	GRB 250702B	7-hour progenitor-less injection, $2.2 \times 10^{54}$ erg; Solar Cycle 25 Peak
2	2014	Double Peak	Solar Cycle 24 rare double maximum; geomagnetic activity
3	2003	Halloween Storms	Powerful X45 flares; Crab Pulsar glitch
4	1992	COBE Mission	CMB ripples maps; hypersphere geometry evidence
5	1981	First Space Shuttle Flight	Columbia launch; 4D “entry point” access era
6	1970	Apollo Era Peaks	Cycle 20 high-energy particles; Moon mission concern
7	1959	Modern Maximum	Peak of Cycle 19; strongest recorded heartbeat
8	1948	Palomar 200-inch Telescope	First light; deep-space data
9	1937	Cosmic Ray Neutrons	First high-energy feed measured
10	1926	Hubble Spike	$H_0 \approx 78$ calculated
11	1915	General Relativity	Einstein publishes field equations
12	1904	Mount Wilson Observatory	Sun study; first high-quality 11-year cycle data
13	1893	Great Sunspot	Largest solar features recorded
14	1882	Great September Comet	Bright comet visible near Sun
15	1871	Great Chicago Fire	Coincided with high solar activity
16	1860	Carrington Event Era	Massive solar injection; telegraph failures
17	1849	First Photo of the Sun	Daguerreotype of solar heartbeat
18	1838	Stellar Parallax	61 Cygni distance measured
19	1827	Year Without Summer Aftermath	Climate stabilization post-Dalton Minimum
20	1816	Dalton Minimum Peak	Weak pulse; global cooling effect
21	1805	Battle of Trafalgar	Major historical event
25	1761	Transit of Venus	Accurate solar distance measurement
38	1618	Triple Comet / Kepler’s 3rd Law	Planetary harmonics observed
39	1607	First Telescope Data	Galileo & Kepler record sunspots

Table 2: Memorable Historical & Astronomical Links for Solar Max Pulses

## 6 Star Events / “Acting Up” During Pulses

Pulse #	Year	Star / Event	Result / Notes
39	1607	Kepler’s Star (SN 1604)	Visible through 1606-1607; tracked by Kepler as it faded
16	1860	Eta Carinae	Great Eruption; 2nd brightest star in sky
15	1871	T Coronae Borealis	Post-outburst active phase (1866)
5	1981	Vela Pulsar / PSR B0833-45	Discovery of Glitches; sudden spin-ups
4	1992	Nova Cygni 1992	Standard candle outburst during double-peak max
3	2003	Crab Pulsar Glitch	Largest glitch recorded; during Halloween Storms
1	2025	T Coronae Borealis (T CrB)	Predicted outburst during 2024-25 solar max; repeat behavior

Table 3: Stars / Astronomical Events Coinciding with Solar Max Pulses

## 7 16.6 Gyr Timeline & Hypersphere Geometry

### 7.1 Timeline vs Observable Horizon

- Observable Horizon: 13.8 Gyr
- RIM True Age: 16.6 Gyr (integrated mass-energy inflows over 11-year pulses)

### 7.2 Hypersphere Curvature Calculation

$$r_{\text{obs}} = 46.5 \text{ Gly}, \quad \Omega_k = 0.004$$

$$R = \frac{r_{\text{obs}}}{\sqrt{\Omega_k}} \approx 735 \text{ Gly}, \quad D = 2R \approx 1.47 \text{ trillion ly}$$

### 7.3 Early SMBH and Galaxy Growth

Object	Redshift ( $z$ )	Standard Age	RIM Age	Status
JADES-GS-z13-0	13.2	320 Myr	2.1 Gyr	Mature galaxy
TON 618	2.21	3.0 Gyr	10.0 Gyr	Natural growth of ultra-massive BH
Phoenix A	1.47	2.0 Gyr	4.6 Gyr	Natural growth of SMBH
CMB Horizon	1100	380,000 yr	380,000 yr	Observational limit

## 8 GRB 250702B – Progenitor-less Inflow Signature

Detected July 2, 2025; duration 25,000 s ( 7 hr); energy  $\sim 2.2 \times 10^{54}$  erg; massive dusty galaxy at  $z = 1.036$ ; off-nuclear quiet patch. JWST follow-up: no SN, no lensing, no thermal/IR excess. Fits RIM prediction of radial inflow, not TDE or collapsar.

## 9 Conclusion

The 11-year solar maxima line up perfectly over 400+ years, coinciding with observable Hubble pulses, historical astronomical events, and GRB activity. The RIM provides a self-consistent framework connecting solar cycles, GRBs, SMBH growth, and the 16.6 Gyr cosmic timeline without external ”dark” parameters.

## References

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