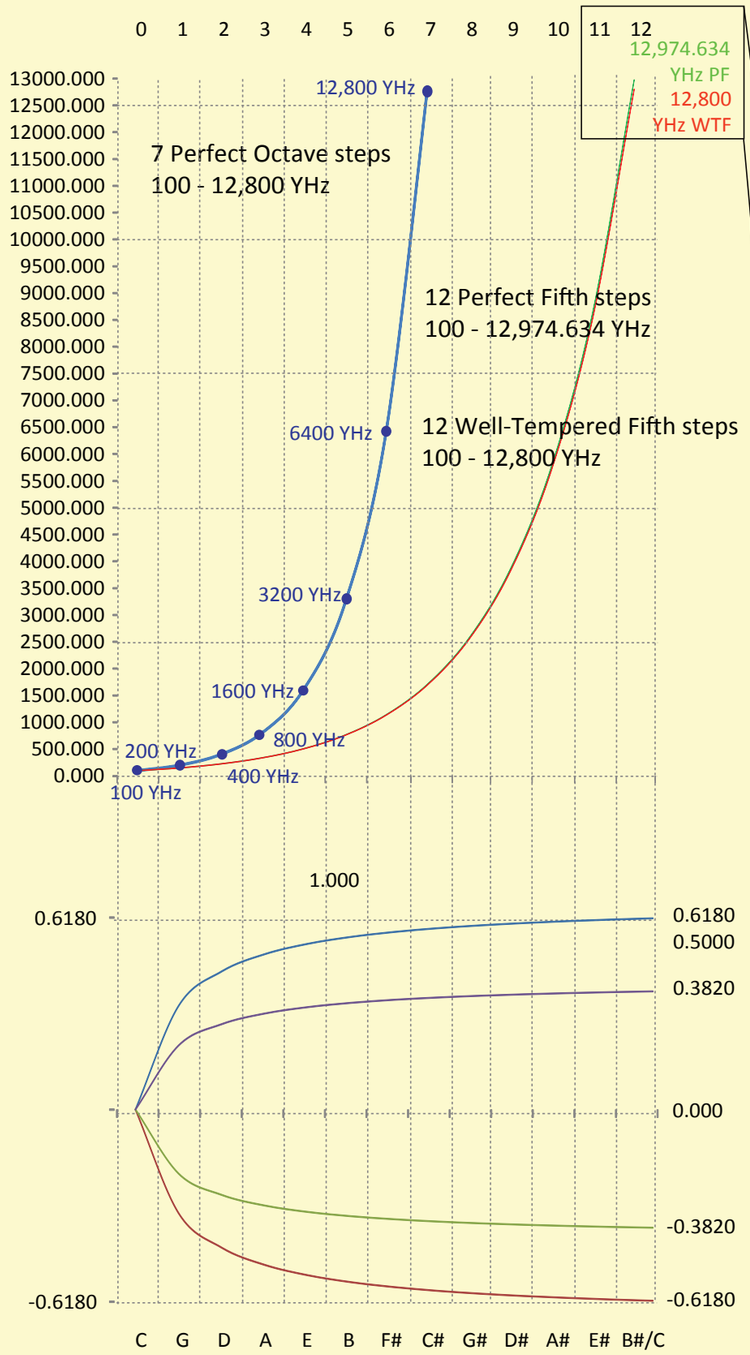
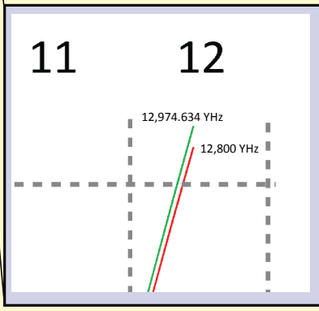


7 Perfect Octaves - Hz Doubling 7 times the progression is from 100 to 12,800 Hz.

12 Perfect Fifths (PF) don't exactly equal (don't 'commute' with) 7 Perfect Octaves (PO),
12 Perfect Fifths progress to 12,974.643 Hz.

12 Well Tempered Fifths (WTF) do exactly equal (do commute with) 7 Perfect Octaves (PO),
12 Well Tempered Fifths progress to 12,800 Hz.

This differential is 'structural'; it is called the 'Pythagorean Comma' (PC).
7 PO:12 PF = Ist full PC Cycle & arrives at Golden Section (GS).



'Pythagorean Comma' (PC) emerges to 'Golden Section (GS).

11	**E#**	8,649.756	8,542.9751	1.5000	1.4983	106.7808	0.6115
12	**B# / C**	12,974.634	12,800.0000	1.5000	1.4983	174.6338	0.6157
13	**G**	19461.9507	19178.33058	1.5000	1.49831	283.6201	0.6194

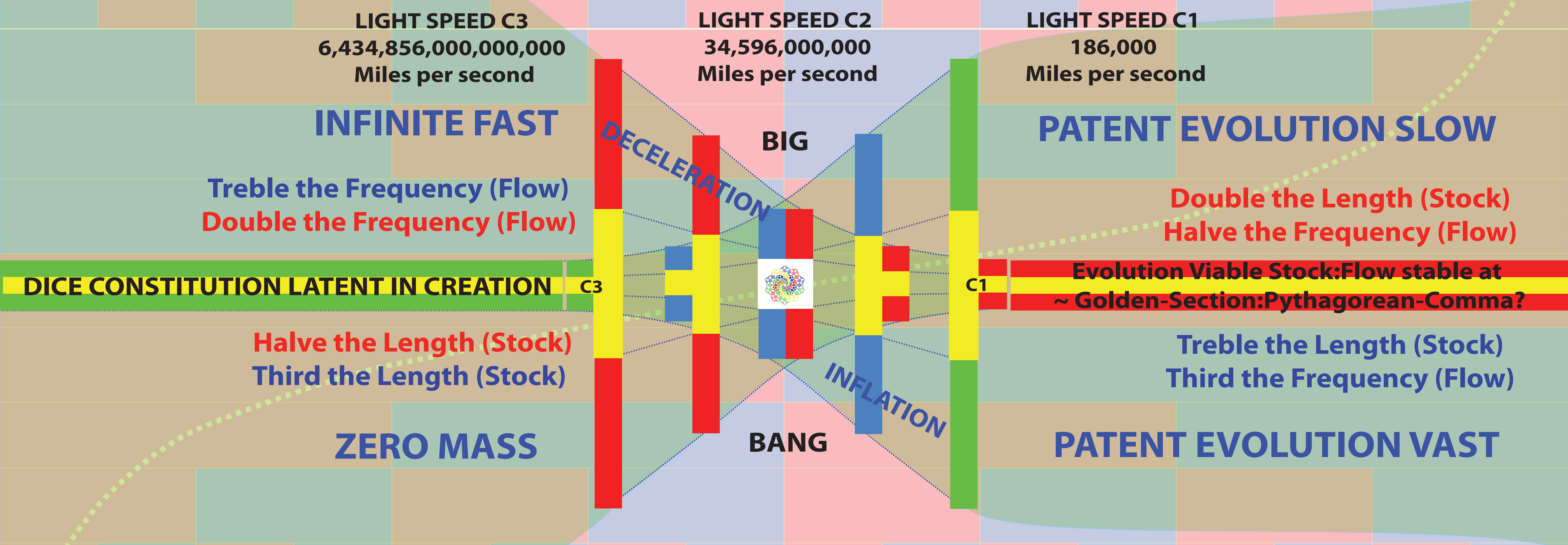
When each step-value of the emerging PC is divided by the preceding step-value, step 12 to step 13 gives avalue that is ~ stable at the Golden Section (GS) 0.618

It has been suggested that this differential is related to the 2nd Law (the 'entropy' law).

		Perfect 5ths	Well Tempered 5ths	Perfect Octaves	Pythagorean Comma	Golden Section
0	**C**	**100.000**	**100.0000**	**100.000**	-	-
1	**G**	150.000	149.8307	200.000	0.1693	0.3335
2	**D**	225.000	224.4924	400.000	0.5076	0.4447
3	**A**	337.500	336.3586	800.000	1.1414	0.5003
4	**E**	506.250	503.9684	1600.000	2.2816	0.5336
5	**B**	759.375	755.0995	3200.000	4.2755	0.5559
6	**F#**	1,139.063	1,131.3708	6400.000	7.6917	0.5718
7	**C#**	1,708.594	1,695.1410	**12800.000**	13.4528	0.5837
8	**G#**	2,562.891	2,539.8417		23.0489	0.5929
9	**D#**	3,844.336	3,805.4628		38.8732	0.6003
10	**A#**	5,766.504	5,701.7518		64.7521	0.6064
11	**E#**	8,649.756	8,542.9751		106.7808	0.6115
12	**B# / C**	**12,974.634**	**12,800.0000**		174.6338	0.6157
13	**G**	19,461.951	19,178.3306		283.6201	0.6194

A 'BIG BANG' CONJECTURE?

VELOCITY INVERSELY PROPORTIONAL to VOLUME



SYMMETRY

FLOW VELOCITY

miles per second

C^3

6,464,168,612,817,770

E=MC^2

34,700,983,524

miles per second

C^1

186,282

SPACE VOLUME

Pre BIG BANG

Post BIG BANG

SYMMETRY

DECELERATION >>>

SYMMETRY

CREATION

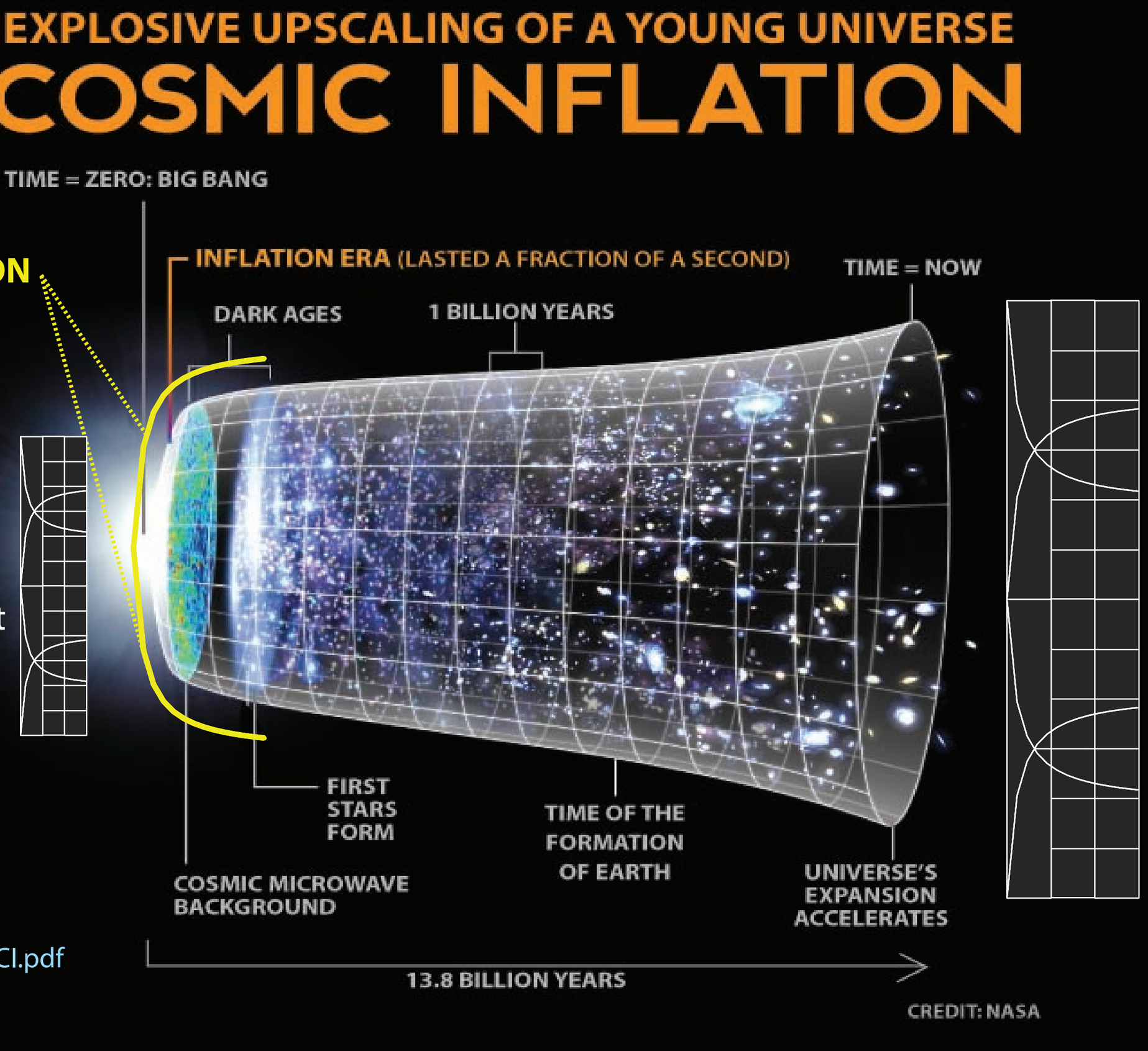
BIG BANG

EVOLUTION

INFLATION >>>

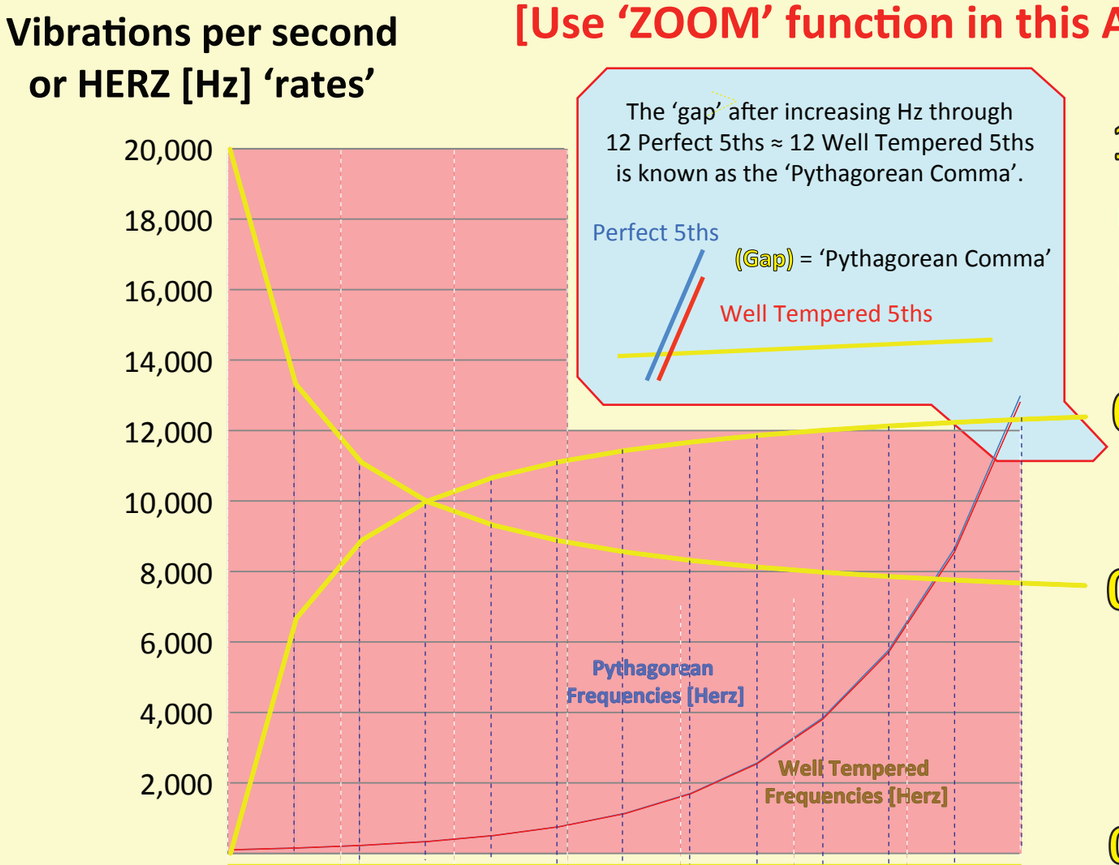
SYMMETRY

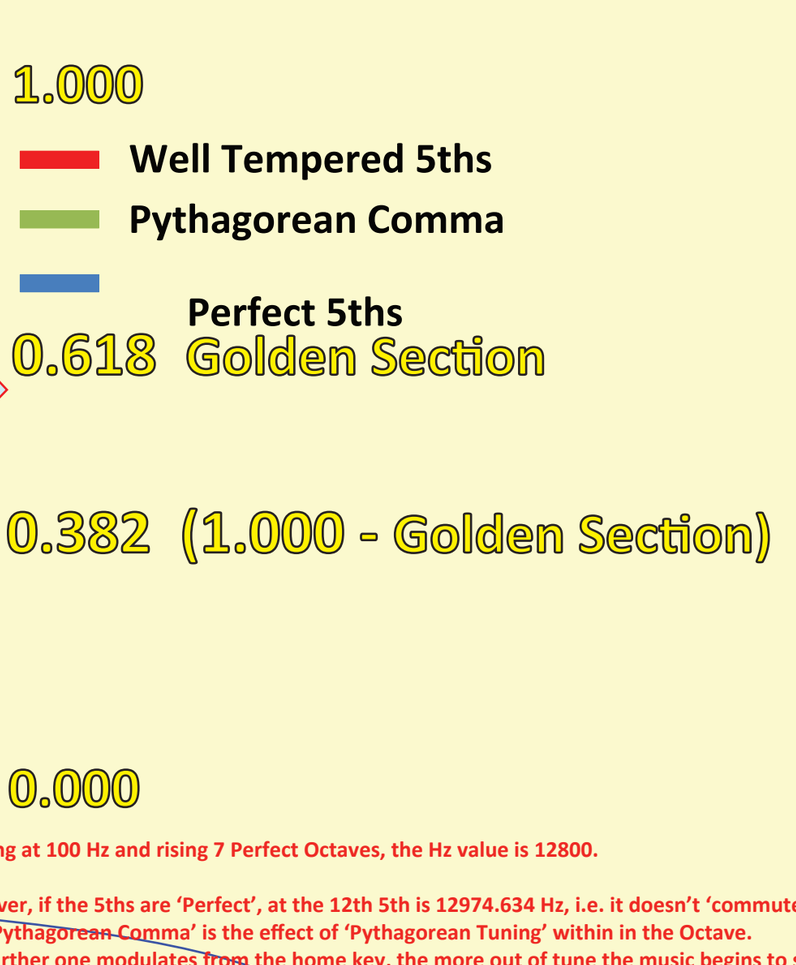
If NASA's diagram of 'inflation' after the 'Big Bang' is accurate, then the 'shape-rate' of 'time-space' emerging during **COSMIC INFLATION** seems perfectly to match the emergence of the 'Pythagorean Comma' where initially the speed of inflation is faster than the speed of light, but slowing to 0.618 at the 'Golden Section' [GS], as at the end of the first cycle of 'Perfect Fifths' from the Trinity [Hemiola or 3 in 1 of 'Stringularity'], which is rather what you would expect isn't it? The detail of GS is here: -
http://www.gci.org.uk/images/PCI.pdf

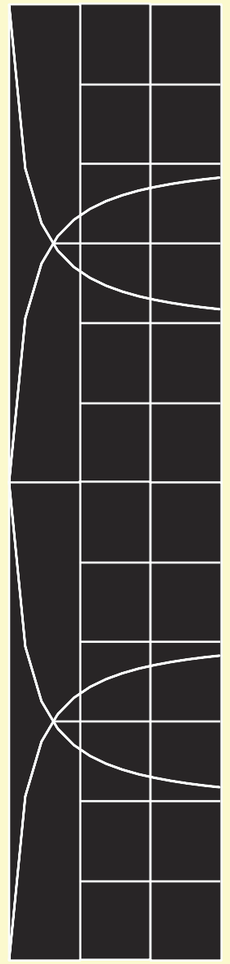


12 Perfect 5ths against 7 Perfect Octaves Reveal the ‘Pythagorean Comma’. Trinity, ‘3 in 1’, [‘Stringularity’] Golden Section; Source-Code of Creation/Nature?

[Use ‘ZOOM’ function in this Adobe Acrodbat File to see detail].







12 Perfect Fifths against 7 Perfect Octaves reveal the ‘Pythgorean Comma’.

C to G	G to D	D to A	A to E	E to B	B to F#	F# to C#	C# to G#	G# to D#	D# to A#	A# to E#	E# to B#
100 to 150 Herz	150 to 225 Herz	225 to 337.5 Herz	337.5 to 505.25 Herz	506.25 to 759.375 Herz	759.375 to 1139.063 Herz	1139.063 to 1708.594 Herz	1708.594 to 2562.891 Herz	2562.891 to 3844.336 Herz	3844.336 to 5766.504 Herz	5766.504 to 8649.756 Herz	8649.756 to 12974.634 Herz

12 Well Tempered Fifths against 7 Perfect Octaves remove ‘Pythagorean comma’.

C to G	G to D	D to A	A to E	E to B	B to F#	F# to C#	C# to G#	G# to D#	D# to A#	A# to E#	E# to B#
100 to 149.8307 Herz	149.8307 to 224.4924 Herz	224.4924 to 336.3586 Herz	336.3586 to 503.9684 Herz	503.9684 to 755.0995 Herz	755.0995 to 1131.3708 Herz	1139.063 to 1695.141 Herz	1695.141 to 2538.8417 Herz	2538.8417 to 3805.4628 Herz	3805.4628 to 5701.7518 Herz	5701.7518 to 8542.9751 Herz	8542.9751 to 12800.000 Herz

7 Perfect Octaves

C - C1	C1 - C2	C2 - C3	C3 - C4	C4 - C5	C5 - C6	C6 - C7
Octave 100 to 200 Hz	Octave 200 to 400 Hz	Octave 400 to 800 Hz	Octave 800 to 1600 Hz	Octave 1600 to 3200 Hz	Octave 3200 to 6400 Hz	Octave 6400 to 12800 Hz

Twelve ‘Perfect Fifths’ almost ≈ 7 ’Perfect Octaves’.
However, Twelve ‘Well Tempered Fifths’ exactly = 7 ’Perfect Octaves’.
The difference between the two is a ‘Universal Constant’ known as the ‘Pythagorean Comma’. After the first full cycle of12:7 of these ‘Perfect Intervals’, the Pythagorean Comma Hz value has settled on the Golden Section value of 61.8%.

Starting at 100 Hz and rising 7 Perfect Octaves, the Hz value is 12800.

However, if the 5ths are ‘Perfect’, at the 12th 5th is 12974.634 Hz, i.e. it doesn’t ‘commute’.
This ’Pythagorean Comma’ is the effect of ‘Pythagorean Tuning’ within in the Octave.
The further one modulates from the home key, the more out of tune the music begins to sound.

So to get them to ‘commute’, if the 5ths are Well-Tempered, the resultant Hz values at the 12th 5th is 12800.000 Hz
Well Tempering is an adjustment to get 7 Perfect Octaves to ‘commute’ with 12 Perfect 5ths at this Hz value.

With this adjustment of making each of the semi-tone steps within the Octave exactly equal,
modulation into any key becomes practical (vide Well Tempered Preludes & Fugues J S Bach)
as the reason for the increasingly out-of-tune effect as modulation further from the home key occurs,
is removed at the price of making music in all the keys very very slightly out of tune.

The benefit is the vastly rich and diverse development of Western music that happened from
the 18th Century onwards, when Well Tempered tuning became the norm.

But the analogue in this is that the FUNDAMENTALS of the first three ‘Structural’ Fibonacci numbers 1, 2, 3 . . . (the ‘DICE’)
slow down to 5, 8, 13, . . . settling at the Golden Section (0.618), the value which dominates EVOLUTION (or ‘PLAYING the DICE’).

12 Perfect Fifths against 7 Perfect Octaves reveal the ‘Pythgorean Comma’.

C to G 100 to 150 Herz	G to D 150 to 225 Herz	D to A 225 to 337.5 Herz	A to E 337.5 to 506.25 Herz	E to B 506.25 to 759.375 Herz	B to F# 759.375 to 1139.063 Herz	F# to C# 1139.063 to 1708.594 Herz	C# to G# 1708.594 to 2562.891 Herz	G# to D# 2562.891 to 3844.336 Herz	D# to A# 3844.336 to 5766.504 Herz	A# to E# 5766.504 to 8649.756 Herz	E# to B# 8649.756 to 12974.634 Herz

12 Well Tempered Fifths against 7 Perfect Octaves remove ‘Pythagorean comma’.

C to G 100 to 149.8307 Herz	G to D 149.8307 to 224.4924 Herz	D to A 224.4924 to 336.3586 Herz	A to E 336.3586 to 503.9684 Herz	E to B 503.9684 to 755.0995 Herz	B to F# 755.0995 to 1131.3708 Herz	F# to C# 1139.063 to 1695.141 Herz	C# to G# 1695.141 to 2538.8417 Herz	G# to D# 2538.8417 to 3805.4628 Herz	D# to A# 3805.4628 to 5701.7518 Herz	A# to E# 5701.7518 to 8542.9751 Herz	E# to B# 8542.9751 to 12800.000 Herz

7 Perfect Octaves

C - C1 Octave 100 to 200 Hz	C1 - C2 Octave 200 to 400 Hz	C2 - C3 Octave 400 to 800 Hz	C3 - C4 Octave 800 to 1600 Hz	C4 - C5 Octave 1600 to 3200 Hz	C5 - C6 Octave 3200 to 6400 Hz	C6 - C7 Octave 6400 to 12800 Hz

Twelve ‘Perfect Fifths’ almost ≈ 7 ’Perfect Octaves’.
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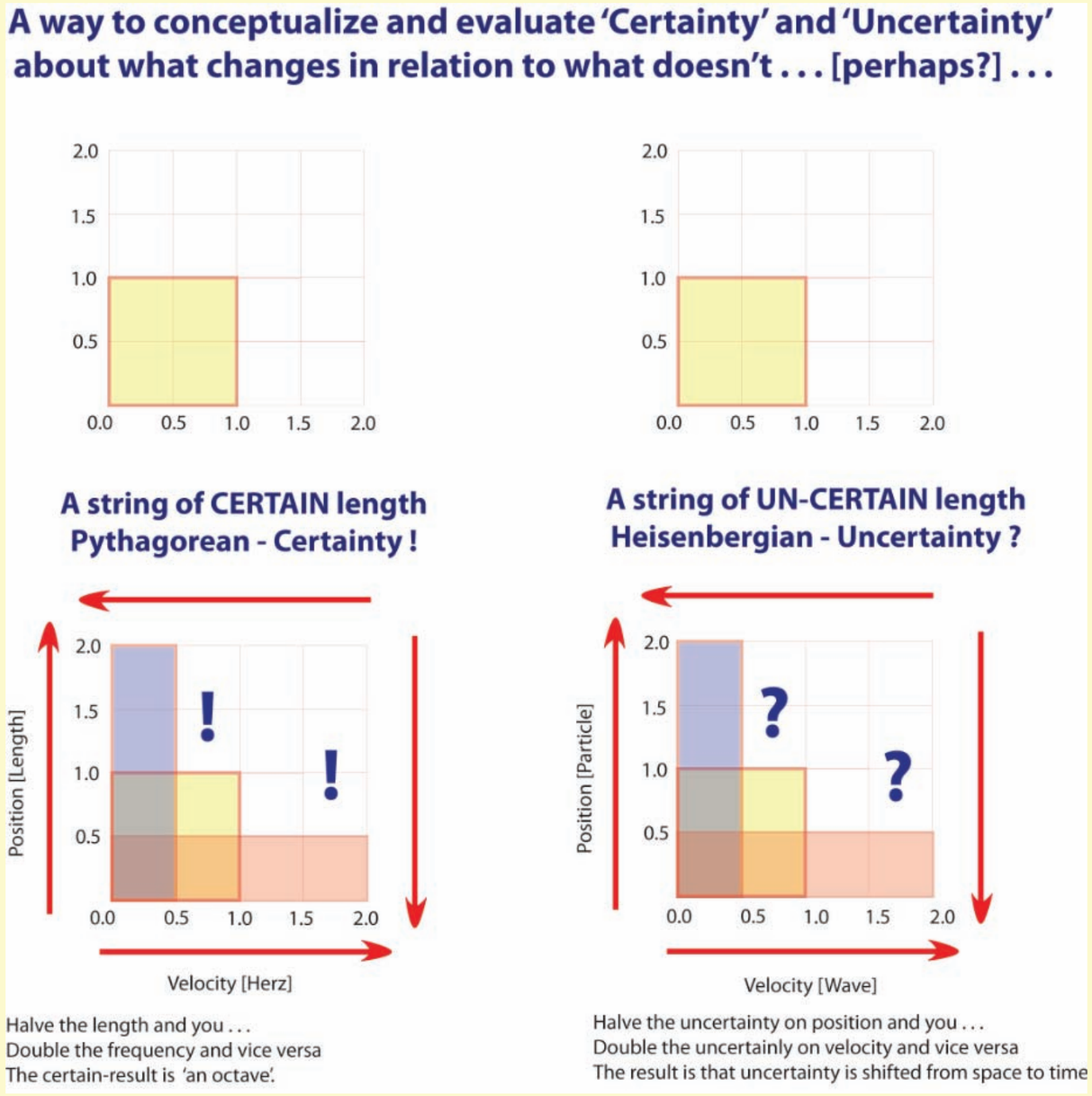


Stephen Hawking addresses Certainty and Uncertainty in his book 'The Grand Design'.

In the light of this, CBAT suggests the following answer to the science policy-challenge of climate change created by humans: - while there may well be uncertainty in the 'scientific' climate-models, that does not lead to a result where policy-models need to follow-suit and be unintelligently designed.

In view of the risks we face and the potential damages that may be sustained, the need for 'risk-averse' 'precautionary policy' - to do enough soon enough - is an intelligent certainty. Betting on the suspension of the laws of physics steers scientific-scepticism towards the evolution of levels of uncertainty that engender a culture of avoidance, political stupidity and collective disaster.

While this is apparently possible, it seems hardly advisable. Music and performing music both alone and en groupe is acutely 'goal-focused'. Similarly, it makes sense to organize for UNFCCC-compliance in a 'goal-focused' way.

Music is Golden-Section-based and provides a template for this C&C is a 'Well-Tempered' framework for playing together in-tune and in-time and CBAT is constructed in this way

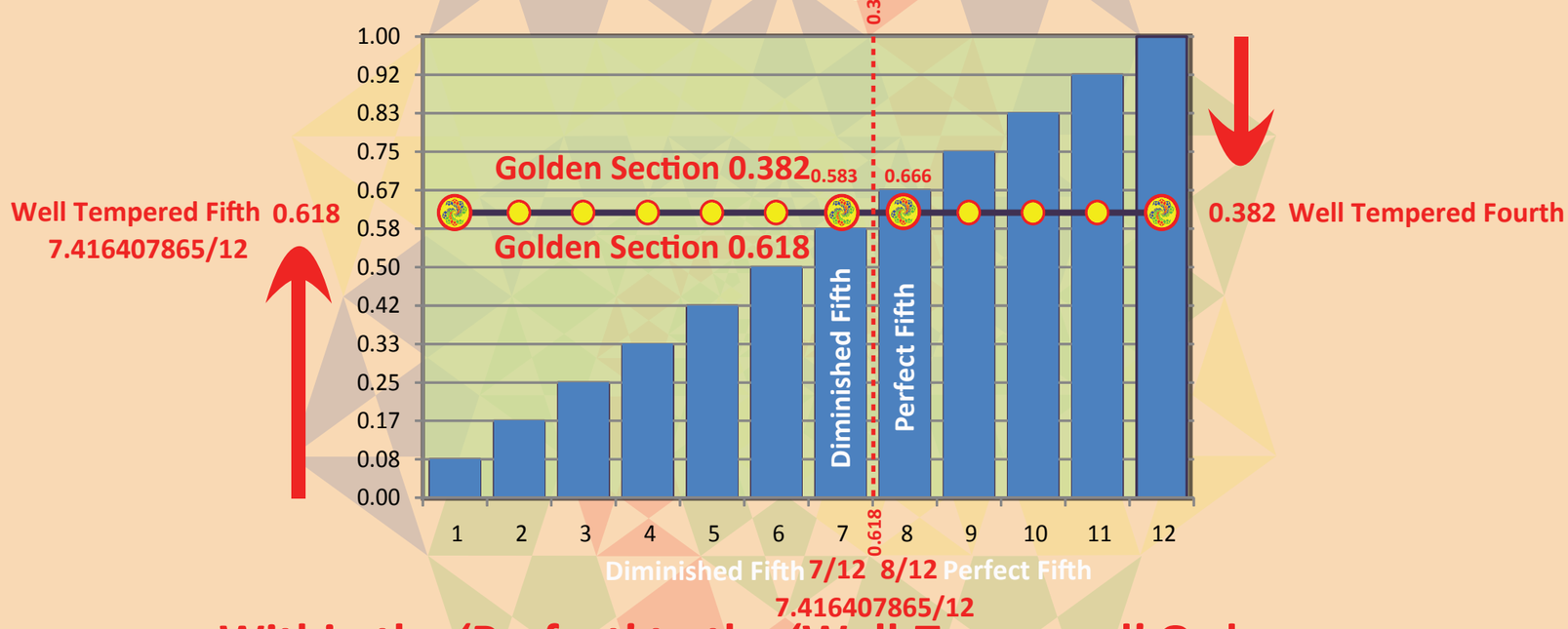
Because of the self-propagating and uncontrollable nature of positive feedback effects consequent on human impacts on the global climate system, the conclusion to draw from the use of CBAT is that negotiating anything above C&C at Low Budget rates with accelerated convergence, is an increasingly certain invitation for humanity to evolve into circumstances to which it will become impossible to adapt.

Somehow, overcoming the wave-or-particle 'quantum paradox', - as in a musical framework perhaps - we have to know both where we are and where we're going. Getting runaway climate change and just calling it 'uncertainty' seems like a high price to pay for failing to figure this out.

UNFCCC-compliance is more coordinating acts-of-will, than acts-of-God.

All is inspired by the example of Pythagoras.
His seminal work on 'stringularity' & the maths of the Golden Section are the
'Deep Simplicity' that all around us underlies and informs all the present Complexity.

The Meeting of the PERFECT FIFTH [8/12 or 0.666]
the DIMINISHED FIFTH [7/12 or 0.583]
& the WELL-TEMPERED FIFTH [7.416407865/12 or 0.618]
The GOLDEN SECTION - is the *'irrational fraction'* 0.618033988749895 . . .



Within the 'Perfect' to the 'Well-Tempered' Order,
what Moves are Golden Section 'Fractals' of What Doesn't.

For my Friend Jelle 27 04 2013