

*“Einsteinian Revolution’s Wrong Turn :
Lumpy Interacting Cosmos Assumed As Smooth Perfect Fluid,
No Dark Energy”*

PLENARY TALK in

XXIX-th International Workshop on High Energy Physics “**NEW RESULTS & ACTUAL PROBLEMS in PARTICLE & ASTROPARTICLE PHYSICS & COSMOLOGY**”,
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<http://eternalblogs.wordpress.com/>

Universal Law of Gravitation in 1687: Newton's Principia

Newtonian Cosmology: Infinite Universe With Uniform Smooth Static Matter

$$\nabla^2 \phi = -4\pi\rho \quad \phi(R=0) = -2\pi G\rho_0 R_b^2 \rightarrow -\infty \text{ if } R_b \rightarrow \infty$$

$$G_a^b = \kappa T_a^b; \quad \kappa = \frac{8\pi G}{c^4}$$

Enter GR: 1916
Revolutionary Concept: Gravity As Space Time Curvature, Finite Space Itself Can be Bent Without Any Edge. Homogeneity & Isotropy
But STATIC uniform Matter Still Yielded: $\rho_0=0$.

Hypothesize "Cosmological Constant": A Spherical Universe With Finite Density

$$\frac{1}{R_0^2} = \Lambda = 4\pi\rho$$

But Slipher, Humason & Hubble Found REDSHIFTED Spectral Lines From Distant Galaxies.

Initially Explained by de-Sitter Vac. Metric: $\Lambda>0$; $\rho=0$

1922: Friedmann Found Expanding Universe Solution

1927: Lemaitre, Expanding Universe Solution

1931: Lemaitre, MNRAS, 91, (i) 483, (ii) 490:

Universe Born From A Primeval Atom

1998: Universe Appeared to Be Accelerating: Distant SNs FAINTER

$$\frac{\ddot{S}(t)}{S(t)} = -\frac{4\pi}{3}(\rho_e + 3p_e) = -\frac{4\pi}{3}[(\rho + 3p) - \Lambda/4\pi]$$

HOT BIG BANG:

“Expanding Universe and the Origin of Elements”, Gamow, *Phy. Rev*, 70, 572-3 (1946)

Correctly Predicts ~25% abundance of He⁴

The heavier elements, of which we are partly made, were created later in the interiors of stars and spread widely in supernova explosions.

1964: Penzias & Wilson Discover a 3K Microwave Radiation, Believed to Be Relic of Primordial Explosion.

1998: Dark Energy: The 3K radiation is actually a relic of the universe at $z \sim 1000$

“Baryon Acoustic Oscillations (BAO) are frozen relics left over from the pre-decoupling universe.”

KARL POPPER (SCIENCE PHILOSOPHER): SCIENTIFIC THEORIES CAN ONLY BE FALSIFIED & NEVER PROVED

Problems With Big Bang: Countless

1. How universe came into being from nothingness. And why 14 Gyr ago?
2. If there was no spacetime at all, the hypothesis of "Quantum Fluctuations" does not work.
3. Flatness, Horizon: Solution "INFLATION" Even More Problematic, new hypotheses
4. Origin of Primordial Density Fluctuations in a claimed Perfect Model
5. Li-7 abundance discrepancy
6. "Dark Energy" With Negative Pressure Almost Embarrassment
7. Some Stars Older Than "Big Bang"
8. SLOAN GREAT WALL ~ 500 Mpc: Is 14 Gyr Sufficient For Its Formation?

Thomas, Abdalla & Lahav, **Excess Clustering on Large Scales** in the MegaZ DR7 Photometric Redshift Survey, Phys. Rev. Lett. 106 (2011) 241301

R.G. Cowley, et al., "A structure in the early Universe at $z=1.3$ **that exceeds the homogeneity scale of the R-W concordance cosmology**, Mon. Not. Roy. Astron. Soc. 429 (2012) 2910. 1.2 Gpc Structure Defies Claim of "Homogeneity"

Alternative Cosmology Group: <http://www.cosmology.info/>

• [Simons Science News](#)

As Supersymmetry Fails Tests, Physicists Seek New Ideas

by: [Natalie Wolchover](#)

November 20, 2012

If nothing new turns up — an outcome casually referred to as the “**nightmare scenario**” — physicists will be left with the same holes that riddled their picture of the universe three decades ago, before super-symmetry neatly plugged them.

NO SIGNATURE OF NON-BARYONIC “DARK MATTER” From

Gamma Ray Astronomy , ICE-CUBE Neutrino Telescope

Accelerator Experiments, Direct Searches Xenon -100 Expt.

Energy Non-Conservation

“Einstein energy associated with the Friedmann -Robertson -Walker metric”

A. Mitra, Gen. Rel. Gravitation, 42(3), 443-469 (2010); arXiv:0911.2340

Metric of Einstein's Static Universe Has a "Black Hole" Type Singularity

$$ds^2 = dt^2 - \frac{dR^2}{1 - 2M/R} - R^2 d\Omega^2; \quad M = \frac{8\pi}{3} \rho_e R^3; \quad \rho_e = \rho + \Lambda/8\pi$$

$$a = \frac{M + 4\pi R^3 p_e}{R^2 \sqrt{1 - 2M/R}}; \quad p_e = p - \Lambda/8\pi; \quad \text{At EH } a = \frac{M}{R^2 \sqrt{1 - 2M/R}}$$

SCALAR Acceleration Blows Up at $R=2M$ the Same Way of BH Event Horizon. Since homogeneous, $a=\infty$ everywhere and which can be avoided iff $M=0; \rho=\Lambda=0$:

Ref: "An Astrophysical Peek into Einstein's Static Universe: No Dark Energy"
A. Mitra, Int. J. A&A, 1, 183-199 (2011)

ESU Considered As a Static Case of FRW Model: Necessary Condition: $\rho_e + 3p_e = 0$

$$\frac{\ddot{S}(t)}{S(t)} = -\frac{4\pi}{3}(\rho_e + 3p_e); \quad (\rho_e + 3p_e) = 0 \rightarrow \text{only } S(t) = At + B$$

Additional Condition: $\rho_e + p_e = 0$; in addition to $\rho_e + 3p_e = 0$; $\rho = p = \Lambda = 0$

Ref: " Λ CDM Cosmology Through The Lens of ESU, The Mother of Λ "
Mitra, Bhattacharyya & Bhatt, Int. J. Mod. Phys. D 22, 1350012 (2012)

Newtonian Cosmology is Better: $\rho=\Lambda/4\pi$: Because of No Horizon Problem

The Original Vacuum De-Sitter Solution: Father of Λ , Is a **STATIC** Solution

$$ds^2 = (1 - 2M/R)dT^2 - \frac{dR^2}{1 - 2M/R} - R^2 d\Omega^2; \quad M = \frac{4\pi}{3} \frac{\Lambda}{8\pi} R^3; \quad \frac{2M}{R} = \frac{\Lambda^2}{3}$$

But with a time dependent coordinate transformation which is singular at $R=2M$

$$ds^2 = dt^2 - S^2(t) \left[\frac{dr^2}{1 - kr^2} + r^2 d\Omega^2 \right]; \quad S(t) = e^{\sqrt{\Lambda}t} : \quad R = rS(t)$$

Static Form Implies Expansion Scalar = 0 : $\Lambda=0!$

Ref: "Interpretational Conflicts Between the Static & Non-static Forms of the de-Sitter Metric"

A. Mitra, **Nature Sc. Reports**, 2, 923 (2012)

$$\theta = u^i_{;i} = 3 \frac{\dot{S}}{S} = \sqrt{3\Lambda}$$

One may also connect the two Forms: $g' = J^2 g$, To Find $\Lambda=0$

Ref: "Why No Big Bang, No Dark Energy But A Likely Fractal Universe"

A. Mitra, **Proc. 32nd Int.Cos. Ray Conf.** (Beijing, Vol. 5, HE, p.219, 2011)

For a FRW Model **Perturbed** By Local Inhomogeneities:

$$\frac{\ddot{S}}{S} = -\frac{4\pi}{3}(\rho + 3p) + \text{Back Reaction Terms} = \text{Positive?}$$

This may simulate a "Dark Energy". Dust Extinction of Lights of Distant SN May Dim It

Ref: A. Mitra: "Energy of ESU & Its Implications For The Λ CDM Model"

JCAP, 03, 007 (2013) (**Most Downloaded Paper For Two Months**)

Introspection About Actual Nature of A Homogeneous & Isotropic Fluid

The FRW Metric Is Derived By Using Purely Geometric Considerations:

For the First Time, Derived by solving Einstein Eqs. For an Adiabatically Evolving Perfect Fluid:

Ref: A. Mitra, Results in Physics, vol. 2, pp. 45-49 (2012) $T_0^0 = \rho; \quad T_1^1 = T_2^2 = T_3^3 = -p$

Yet There Are Many Subtle Aspects of the problem having : $g_{00} = e^{\nu} = 1; \text{ i.e, } \nu=0$

$$\nu'(r, t) = \frac{-2p'(r, t)}{\rho + p}$$

Local Energy Mom Con.
Eq. Leads to: $p(t)=0!$

$$\nu(t) = \frac{-2p(t)}{p(t) + \rho(t)}$$

Ref: 1. "The matter in the Big-Bang model is dust and not any arbitrary perfect fluid!"

A. Mitra, Astrophys. Sp. Sc. 333, 351-356 (2011)

2. "Why Big Bang Model Cannot Describe the Observed Universe Having Pressure & Radiation"

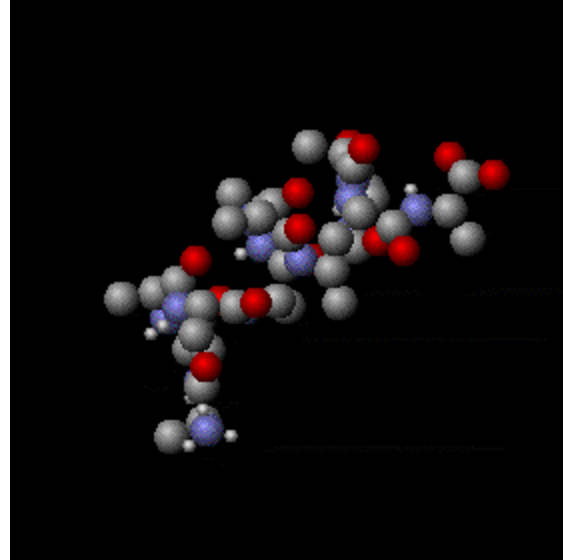
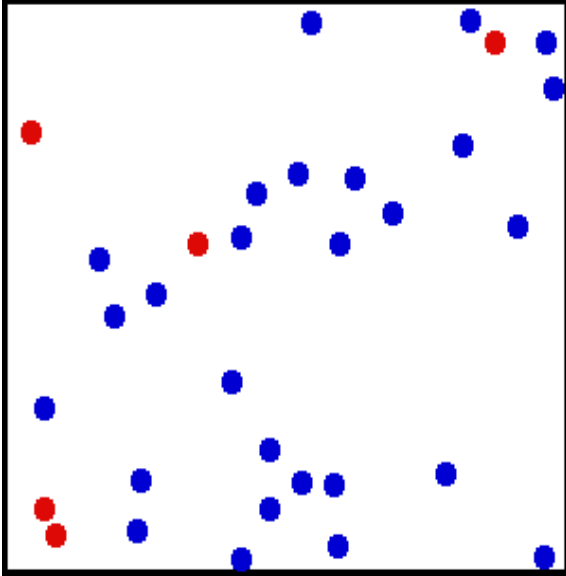
A. Mitra. J. Mod. Phys. 2, 12, 1436-1442 (2011)

"Physical Interpretation of Vacuum Solutions of Einstein's Equations."

W. Bonnor, General Relativity and Gravitation, Vol. 24, 551-574, 1992

"Special attention is paid to those of Schwarzschild, Curzon and Kerr, and it is argued that the **bizarre topologies they have been endowed with are physically unrealistic.**

Temperature & Pressure Are Associated With Randomness of Fluid Particles



But by Big Bang Model (and all models which set $g_{00}=1$, Motion of Fluid Particles Galaxies, Photons... Perfectly Radial Without Any Collision

Hence Such Models Correspond to $p=0$ & $T=0$! (Dust Model).

Such Models Cannot Explain The Physical Universe Having Pressure, Collision, Heat Flow, Radiation

“Friedmann Robertson Walker Metric in Curvature Coordinates and Its Applications”

Ref: A. Mitra, Gravitation & Cosmology, 19(2), 134-137 (2013): Maiden Derivation

$$ds^2 = \alpha^2 \frac{1 - 2M_e/R}{1 - KR^2} dT^2 - \frac{dR^2}{1 - 2M_e/R} - R^2 d\Omega^2; \quad K = \frac{k}{S^2}; \quad \alpha = \frac{\partial t}{\partial T}$$

Connect the Comoving & Schwarzschild Forms: $g' = J^2 g$ to find that INTRINSICALLY FRW Metric is Either Static or Vacuum: Already found: Static FRW = Vacuum With $\Lambda = 0$

$\dot{S}r = 0$; comoving coordinate $r \propto$ no. of particles

1. Mitra, “Revisiting the old problem of general-relativistic adiabatic collapse of a uniform-density self-gravitating sphere”, Gravitation & Cosmology 17, 17 (2012)
2. Mitra, “No uniform density star in GR”, Astrophys. Sp.Sc. 333, 169 (2011)

Solution of Real Phys. Problem = $\rho, p, M, \text{Heat Flow, Dissipation} + \text{Complexities}$

Such COMPLEXITIES Can Vanish Only When There Is No Motion, No Evolution, i.e, INTRINSICALLY $\rho=p=0$ Even Though Algebra/Math would contain those symbols! At Best, Such IDEALIZED EXACT Solutions Hint At Asymptotic Final States

Best Example: Hilbert Solution For a Point Mass: Integration Constant: $\alpha_0 = 2M_0 = 0$
Thus Real Universe Must Be Significantly Different From Idealized FRW Model !

Towards Non-Singular Quasi-Newtonian Infinite & Eternal Universe

S. Arrhenius 1908 + J. Holtsmark (1919) : For Any Given Star, Total Force:

Fluctuating Force By Random Nearest Neighbours + Constant Force By Infinite Background (Inverse Square Law) = Finite Force

Indeed a finite residual Grav. Accel. Of 10^{-10} m/s² is found in Galaxy, Galaxy Clusters!

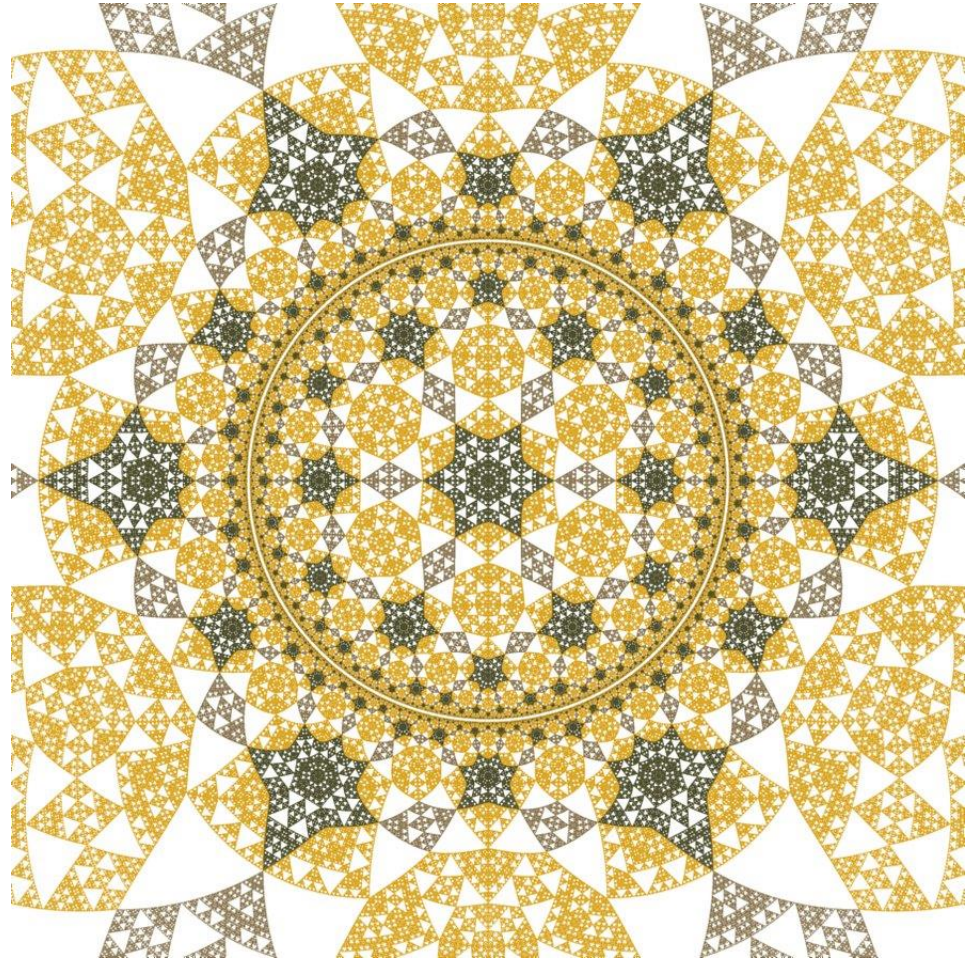
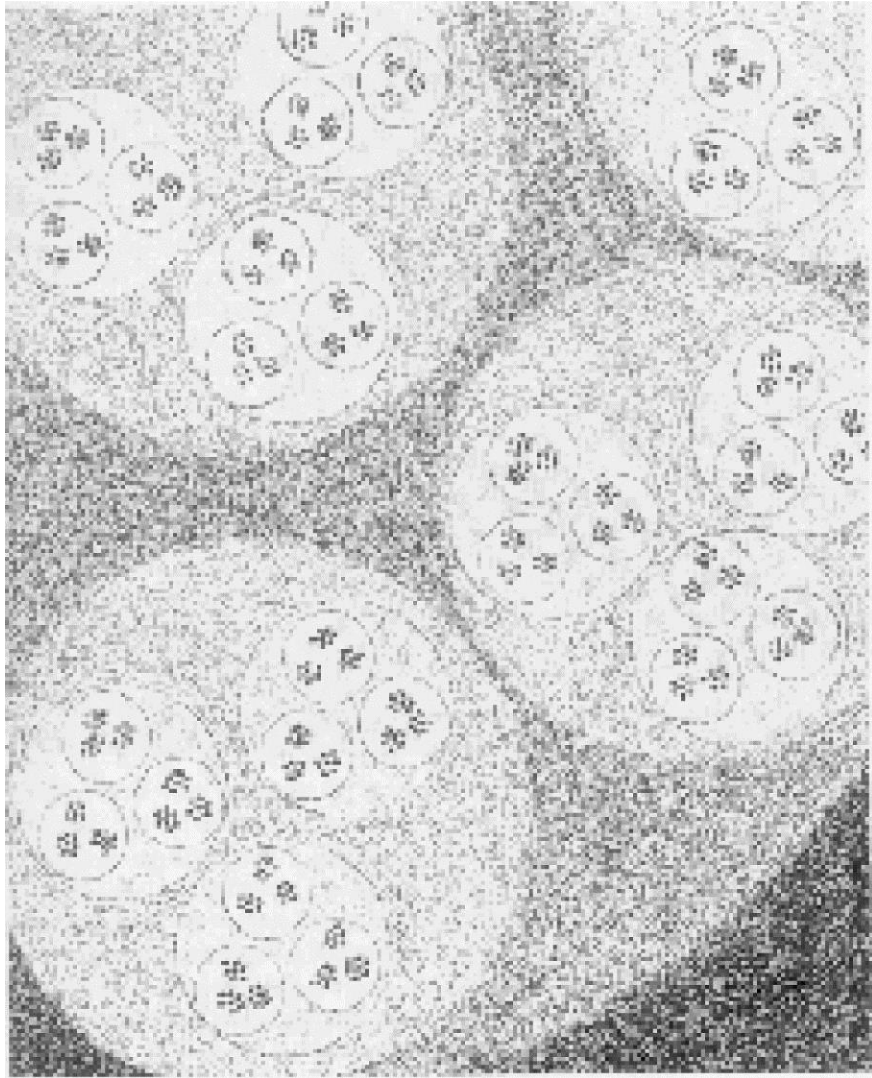
The observed cosmos has Fractal Structure upto ~100 Mpc & May Be Beyond

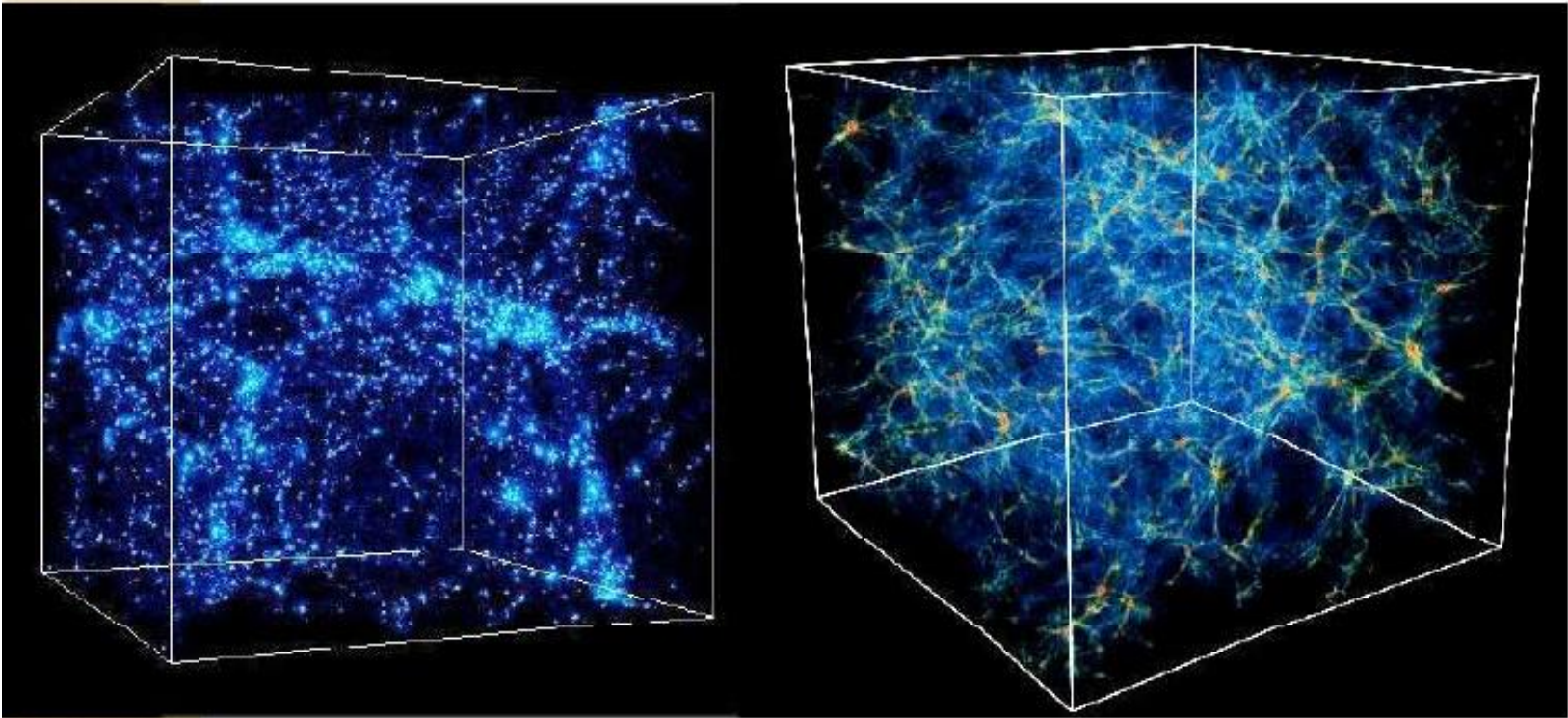
F.S. Labini and L. Pietronero, The complex universe: recent observations and theoretical challenges, J. Stat. Mech. 1011 (2010) P11029 [arXiv:1012.5624]

A Fractal Structure With Dimension $D \sim 2.0$

C.V.L. Charlier, Wie eine unendliche Welt aufgebaut sein kann, Arkiv for Matematik, Astronomi och Fysik 4 (1908) 1.

F. Selety, Beiträge zum kosmologischen Problem, Annalen der Physik 373/68 (1922) 281.





QUESTIONS ABOUT THE MICROWAVE BACKGROUND RADIATION

Big Bang's Afterglow Fails Intergalactic 'Shadow' Test

Sep. 5, 2006 — The apparent absence of shadows where shadows were expected to be is raising new questions about the faint glow of microwave radiation once hailed as proof that the universe was created by a "Big Bang." Lieu, ApJ 684, 2006

Is there a violation of Copernican principle in radio sky? Singal arXiv:1305.4134

WMAP & PLANCK : anisotropies aligned with the ecliptic .Here we report even larger anisotropies in the sky distributions of powerful extended quasars and some other subclasses of radio galaxies in the 3CRR catalogue: about a plane passing through the two equinoxes and the north celestial pole for all sources, which rules out any local effects to be the cause of these anomalies. What is intriguing even further is why such anisotropies should lie about a great circle decided purely by the orientation of earth's rotation axis and/or the axis of its revolution around the sun?

Hoyle, Burbidge, and Narlikar, `` A Different Approach to Cosmology, Cambridge University Press'', Cambridge 2000: Thermalization of Starlight =MBR

Mitra: Cosmological Properties of Eternally Collapsing Objects: arXiv:0907.2532

The distantly observed T~few K IRRESPECTIVE of ECO Mass,
Superposition of Such Point Sources of Microwave Radiation May Generate MBR

Broodings About The Origin of Cosmological Redshift

Crawford, Observational Evidence Favors a Static Universe, J.Cosmol, 13, 3875, 2010

Kocevski & Petrosian, ``On The Lack of Time Dilation Signatures in Gamma-ray Burst Light Curves'', Astrophys. J. 765 (2013) 112 [arXiv:1110.6175]

Hubble de-Vaucouleurs Paradox:

Hubble's Law is a consequence of Strict Homogeneity, But on 5-10 Mpc scale, Galaxy Distribution Is highly inhomogeneous. Then How Hubble's Law is Valid Here?

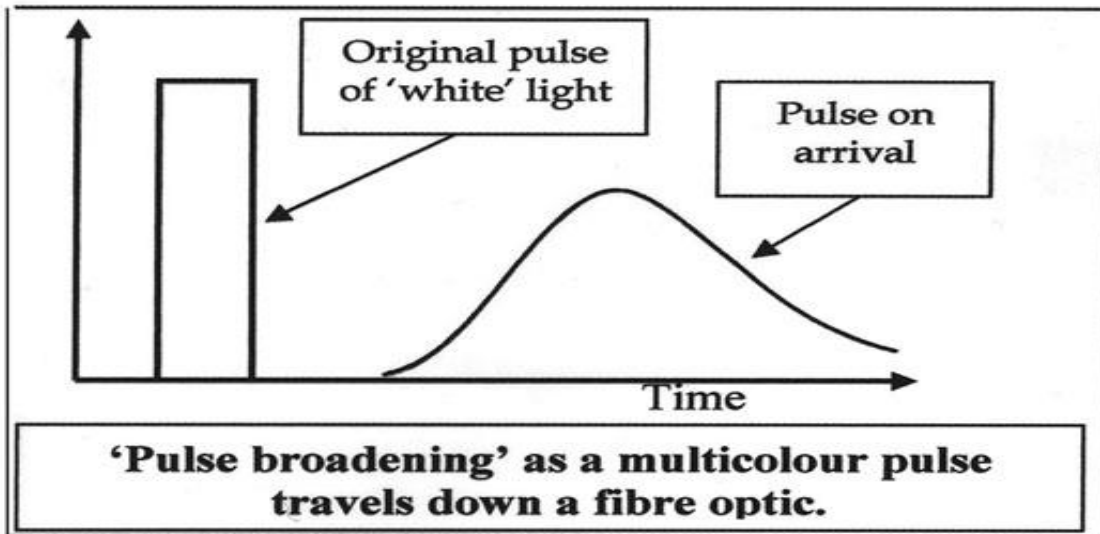
Space Is No Ether, Then How Can Space Expand? What Does It Expand Into?

For $k=0, -1$, Proper Volume of FRW Universe $=\infty$, Then How Could It Be a Point Ever?

Urban et al. ``The quantum vacuum as the origin of the speed of light'',
Eur. Phys D67, 58 (2013):

``We show that if we simply model the propagation of the photon in vacuum as a series of transient captures within these ephemeral pairs, we can derive a finite photon velocity'

If so, Photons Might Lose Energy During Long Journey: ECO Flares May Belch Out H,
HOT ECO Atmosphere May Create Light Elements



[Found Physics](#), 34,1929 (2004)
De Broglie Tired Light Model and
the Reality of the Quantum Waves'
[J. R. Croca](#)

“The history of science teaches that the greatest advances in the scientific domain have been achieved by bold thinkers who perceived new and fruitful approaches that others failed to notice. If one had taken the ideas of these scientific geniuses who have been the promoters of modern science and submitted them to committees of specialists, there is no doubt that the latter would have **viewed them as extravagant and would have discarded them for the very reason of their originality and profundity.**” : de Broglie

ECO Flares May Belch Out H, HOT ECO Atmosphere May Create Light Elements
Mitra ``Radiation Pressure Supported Stars As Quasar Central Engines’’
J. Cosmology 17, 7376 (2011)

Einstein - Lemaitre: Your Calculations Are Correct But Your Physical Insight Abominable

May Be In Future: Precision Cosmology!



“Today's scientists have substituted mathematics for experiments, and they wander off through equation after equation, and eventually build a structure which has no relation to reality.” [Nikola Tesla](#)