

9. COMPACT CONCLUSION (rev. 2020)

df. = definition, pr. = proposition

- df. 01 The Universe (U): the hidden reality confronting us in our observations and experiments.
df. 02 A world-model: a consistent formal description of U which is testable against experience.
df. 03 The universe (u): the model chosen by us for consideration among all possible world-models.
df. 04 The substratum (S): a particle-tied aether related to cosmic microwave background radiation.
df. 05 Fundamental particles (FP): material objects / human observers at rest in S (relative to CMBR).
df. 06 Accidental particles (AP): material objects / human observers moving in S (relative to CMBR).
df. 07 Atomic clocks: precision clocks constructed by using atoms of the same type as "Zeit-Gebers".
df. 08 Cosmic time \mathcal{T} : the time read off properly synchronized atomic master-clocks associated to FP. (if the universe originated in a "big bang" singularity, this would serve as a common time zero).
df. 09 Absolute simultaneity: the non-locality of a quantum event apt to define a distinct world-state.
df. 10 The differential light speed: the co-efficient c between infinitesimal elements of space and time.
df. 11 The distance to and fro an object: the integral light speed times the difference between the two clock-readings marking the emission and the reception of a radar-signal reflected by the object.
df. 12 The reflection-instant of a signal: an instant in the open interval between emission and reception.
df. 13 Reference frame: a feigned spatial grid of clocks keeping fixed distances to an observer in origo.
df. 14 Proper time: the time shown by the atomic master-clock conjoined to some object, or observer.
df. 15 Frame time: the time shown by atomic slave-clocks at rest in the spatial frame of an observer.
df. 16 Einstein-convention: the standard rule for synchronizing slave-clocks at rest in a spatial frame.
df. 17 Milne-regraduation of cosmic time: transmutes the map of an expanding universe with atoms of fixed size into the map of a stationary universe of shrinking atoms & vice versa.
- pr.01 All experience testifies that Time Flows, the Present separating the Past from the Future.
pr.02 The Now is the moment of Becoming when Reality emerges, annihilating empty possibilities.
pr.03 The Universe (U) must therefore be subject to the Absolute Simultaneity of a Cosmic Time \mathcal{T} .
pr.04 Atoms of the same type, if exposed to similar conditions, partake in the same Cosmic Rhythm.
pr.05 Only a universe (u) with an infinite substratum of fundamental particles sustains such a rhythm.
pr.06 In order for there to be invariant laws, galaxies must be dissipating relative to the sizes of atoms.
pr.07 The only relevant universes are those with a structure determined by a substratum in dissipation.
pr.08 The crucial property of such universes is not homogeneity but the symmetry of Cosmic Isotropy.
pr.09 The substratum S of fundamental particles is covered by local layers of accidental particles.
pr.10 Fundamental particles, FP, are at rest in S, relative to CMBR. Accidental particles, AP, are not.
pr.11 The clocks of fundamental particles count Universal Time, but those of accidental ones do not.
pr.12 A fictitious spatial standard frame can be ascribed to any object, whether at rest or in motion.
pr.13 But it can never be supplied with identical clocks except for infinitesimal elements of the grid.
pr.14 At any time \mathcal{T} , only one fundamental particle can be at rest in a frame, being its natural Origo.
pr.15 Any AP, say Q, refers at any instant \mathcal{T} to two FPs: passing by FP1, it is at rest relative to FP2.
pr.16 The clock of Q is retarded relative to that of FP1 due to motion, to that of FP2 due to gravity.
pr.17 The motional energy of Q relative to FP1 equals the gravitational energy of Q relative to FP2.
pr.18 The standard dilatation of Q-time t is $1/\sqrt{1-v^2}$ relative to FP1 and $1/\sqrt{1+2\varphi}$ relative to FP2.
pr.19 Hence it is not the master clock of an FP crossing the standard frame of another FP that is slow.
pr.20 Rather the slave clocks of that frame are slow relative to the master clock of any FP showing \mathcal{T} .
pr.21 Gravitation is a local, direct, and instantaneous, consequence of the universal dissipation of FP.
pr.22 The Einstein-Friedmann-Lemaître eqs. are null and void: gravitation is not universal, only local.
pr.23 Flat 3-space is not needed in order to ensure that the gravitational energy of FP sum up to zero.
pr.24 There is no evidence for "universal inflation", nor for the existence of "dark" matter or energy.

10. SYMBOLIC SURVEY (rev. 2020)

Postulate of Universal Time: $\mathcal{T} = \text{invar.}$

differential light speed: $c \equiv \frac{\text{space element}}{\text{time element}} \equiv 1$

proper time on observers' clock: $\tau_1 \leq \tau \leq \tau_3$

one way light speeds: $\tau \equiv \tau_3 - r/c_{\leftarrow} \equiv \tau_1 + r/c_{\rightarrow}$

universal two way light speed: $\frac{1}{2}(\frac{1}{c_{\leftarrow}} + \frac{1}{c_{\rightarrow}}) \equiv \frac{1}{c} \equiv 1$

standard frame time coordinate: $t \equiv \frac{1}{2}(\tau_3 + \tau_1)$

standard frame space coordinate: $r \equiv \frac{1}{2}(\tau_3 - \tau_1)$

standard red shift: $1+z(t) = e^{(\tau_3-t)/t_o} = e^{r/r_o}$

natural units: $r = r_o = t_o \equiv 1 \Rightarrow 1+z(r) = e$

proper distance: $\mathcal{R}(\mathcal{T}) \equiv 2 \tanh \frac{1}{2} r(t)$

World Map: an invisible hyperboloid of co-existing objects

$$d\mathcal{T}^2 = dt^2 - ds^2. \quad ds^2 = dr^2 + \sinh^2 r^2 (d\theta^2 + \sin^2 \theta d\phi^2)$$

The hyperbolic space of *World Map* is isotropic and homogeneous.

World View: a visible pseudo-sphere of shells of varying age

$$c^2 dt^2 = d\mathcal{T}^2 + ds^2. \quad ds^2 = \{d\mathcal{R}^2 + \mathcal{R}^2(d\theta^2 + \sin^2 \theta d\phi^2)\} / (1 - \frac{\mathcal{R}^2}{4})^2$$

The flat space of *World View* is isotropic, but not homogeneous;

this explains the observed crowding of objects with distance:

www.astro.ucla.edu/~wright/stdystat/htm,fig.21-3.

Model M₁: "Steady State"

$$\rho \equiv \sinh r / e^t \equiv \mathcal{R} / e^{\mathcal{T}}$$

$$e^t d\rho = \cosh r dr - \sinh r dt = dr - \sinh r d\mathcal{T}$$

$$\mathcal{T} = \ln\{e^t / \cosh^2 \frac{r}{2}\} = \ln\{e^t (1 - \frac{\mathcal{R}^2}{4})\} = \text{invar.}$$

$$v \equiv dr/dt \Big|_{d\rho=0} = \tanh r. \Rightarrow \gamma_v \equiv 1/\sqrt{1-v^2} \Big|_{d\rho=0} = \cosh r = \frac{dt}{d\mathcal{T}}$$

$$\mathcal{H}_1(\mathcal{T}) \equiv \dot{\mathcal{R}}(\mathcal{T})/\mathcal{R}(\mathcal{T}) \propto \text{constant}$$

Model M₂: "Fierce Blow"

$$\rho \equiv \sinh r / \sinh t \equiv \mathcal{R} / \sinh \mathcal{T}$$

$$\sinh t d\rho = \cosh r dr - \sinh r \coth t dt = dr - \sinh r \coth \mathcal{T} d\mathcal{T}$$

$$\mathcal{T} = \text{arsh}\{\sinh t / \cosh^2 \frac{r}{2}\} = \text{arsh}\{\sinh t (1 - \frac{\mathcal{R}^2}{4})\} = \text{invar.}$$

$$v \equiv dr/dt \Big|_{d\rho=0} = \sqrt{\sinh^2 r + \rho^2} / \cosh r. \Rightarrow \gamma_v \equiv 1/\sqrt{1-v^2} \Big|_{d\rho=0} = \cosh r / \sqrt{1-\rho^2}$$

$$\mathcal{H}_2(\mathcal{T}) \equiv \dot{\mathcal{R}}(\mathcal{T})/\mathcal{R}(\mathcal{T}) \propto \coth \mathcal{T} \xrightarrow{\mathcal{T} \rightarrow \infty} \mathcal{H}_1$$

Model M₃: "Gentle Flow"

$$\rho \equiv \sinh r / \cosh t \equiv \mathcal{R} / \cosh \mathcal{T}$$

$$\cosh t d\rho = \cosh r dr - \sinh r \tanh t dt = dr - \sinh r \tanh \mathcal{T} d\mathcal{T}$$

$$\mathcal{T} = \text{arch}\{\cosh t / \cosh^2 \frac{r}{2}\} = \text{arch}\{\cosh t (1 - \frac{\mathcal{R}^2}{4})\} = \text{invar.}$$

$$v \equiv dr/dt \Big|_{d\rho=0} = \sqrt{\sinh^2 r - \rho^2} / \cosh r. \Rightarrow \gamma_v \equiv 1/\sqrt{1-v^2} \Big|_{d\rho=0} = \cosh r / \sqrt{1+\rho^2}$$

$$\mathcal{H}_3(\mathcal{T}) \equiv \dot{\mathcal{R}}(\mathcal{T})/\mathcal{R}(\mathcal{T}) \propto \tanh \mathcal{T} \xrightarrow{\mathcal{T} \rightarrow \infty} \mathcal{H}_1$$

Ungar [2008] has derived a formula obviating the need for dark matter.

Hoyle & al. [2000] explain CMBR by graphite whiskers in cosmic space.

Lerner [2020] has challenged the BB-nucleosynthesis of light elements.

BB-theory cannot explain the formation of oldest stellar structures.

For comparison, cf. Ch.5, §§ 6-7 & conclusion.

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First of all I want to thank my former student and collaborator Peter Øhrstrøm - together with whom I wrote my first published paper on relativity theory, Wegener & Øhrstrøm [1975], as well as my only published paper on tense logic, Wegener & Øhrstrøm [1996] - for a friendship that has now lasted more than four decades. Peter has written important papers of his own on relativity, e.g. Øhrstrøm [2000], before he left physics for good in favour of his passion for tense logic and its applications to AI.

In 1974, I had the good fortune to meet the renowned cosmologist and historian of science John North when he was a visiting professor at the university of my hometown Aarhus. After a conversation dr. North had the kindness to suggest my name to Julius Fraser, founder of *ISST (International Society for the Study of Time)*. In that forum I got acquainted with many other interesting and prominent people, e.g., Gerald Whitrow, Gert Müller, David Park (a dear friend), Peter Landsberg, and Paul Davies.

In the autumn of 1987, I found an advertisement in *British Journal for the Philosophy of Science*, where dr. Michael C. Duffy announced a conference on the *Physical Interpretations of Relativity Theory*, to be held at the Imperial College in London the following year. I wrote to dr. Duffy, sending him the draft of a paper, and was invited. This was to be the first of a whole series of biennial conferences, of which I attended those in London in 1988, 1990, 1992, 1994, 1996, 1998, and 2002, as well as two other conferences in Budapest in 2007 & 2009, arranged by dr. Laszlo Székely, presenting papers at them all. To participate in these conferences meant everything to me: I met numerous interesting people, of which I can only mention a few: Roger Jennison, Gope Keswani, Ludwik Kostro, Peter Kroes, Alexei Nesteruk (my special friend), Pierre Noyes, Viv Pope, Simon Prokhovnik, David Roscoe, Peter Rowlands, Mendel Sachs, Ruggiero Santilli, Franco Selleri (a close friend), Lawrence Sklar, Maurice Surdin (a close friend), Barrie Tonkinson, Håkan Törnebohm, and Friedwardt Winterberg. In ch.1, I have praised the merits of dr. Duffy as the inspiring and indefatigable organizer of these conferences. After a few years, dr. Duffy was attacked by a severe sclerosis which made him share the tragic fate of Stephen Hawking.

In 1992, I found an article by André Mercier in *Gen.Rel.Grav.* [1975] which caught my attention, as it contained the provocative statement "*Gravitation is Time*". This induced me to write him a letter that started a long correspondence ending up with an invitation to visit him at his summer residence in France. At that time he had just lost his wife whom he had met when he studied with Niels Bohr in Copenhagen. After having visited him together with my wife in 1993, being now a member of the organizing *PIRT* committee, I seized the opportunity to invite him to participate in the 1994 *PIRT*-conference in London. Later I also succeeded in persuading him to visit us in our private home in Aarhus, in connection with a symposium I arranged in 1996 over the theme "*Time, Creation & World Order*", cf. Wegener ed. [1999]. At this special occasion he contributed a paper which he described as his "spiritual testament".

Finally, I would like to thank my friends Peter Rowlands and Abraham Ungar for their inspiring company during our stay in Budapest when participating in the second *PIRT*-conference in that city 2009. I can only regret that limited capabilities and advanced age prevent me from fully exploiting their highly ingenious contributions to contemporary mathematical physics: Rowlands [2007] & Ungar [2008].

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WISE & WITTY
words by my friend

TOM PHIPPS, ARCH-HERETIC
on relativity theory

"You don't get physical garbage out of any mathematical theory without putting it in at the start. Actually the 'physics' deduced in such cases is invariably a form of emergency surgery to stop arterial bleeding of the logic of the theory. According to Einstein, GRT was solidly built upon SRT. SRT was built upon c as a limiting speed in nature. And GRT, without contradicting SRT, 'predicts' - in flat contradiction of SRT - that something called 'space' long ago exhibited a physical property of spectacular inflational elasticity but, in agreement with SRT, no longer does so today because, if it did, we would measure speeds greater than c in our lab. However, we can look at galaxies in opposite directions today and see this elasticity at work - while, according to SRT's 'worldline' concept, long ago and today and the distant future are all the same, any distinction being physically meaningless (because observers in different states of motion disagree about them). And if long ago and today are the same ..., because of spacetime symmetry, so separations of objects in our lab and of distant galaxies are the same - and lab space is elastic, after all, like the critical sense of the relativist. If you buy all or any of that, there is a bridge in Brooklyn I'd like to sell you ... and a tonic that long ago would have grown hair on a billiard ball, though not today - except that long ago and today are the same, so it might be worth an open-minded trial at your risk, \$179.95 the bottle plus postage!"

*T.E. Phipps jr., 2006: **Old Physics for New**, p.219.*

