RECIPROCITY

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LARSON, ALLEN AND OTHERS ON SPACE TRANSLATION

Space translation means the assumption that space moves with time at a definite non-zero rate, probably 3 X 10^5 km/sec. There is a further implication that time progresses uniformly with the space progression, provided that space translates uniformly with time. Ridiculous assumption?

I. Newton and A. Einstein did not entertain this unfamiliar assumption. They assumed rather that the idea of MOTION is applicable to things and light, but NOT to time and/or space. In terms of the usual Newton-Einstein assumption of STATIONARY space-time an explanation of many ordinary cases of every day MOTION has been provided. Space-time was a stationary, CONTINUOUS medium that stayed put, while things and the light of stars, moved THROUGH the fixed medium, according to Einstein. Yet the question may be asked: When and where has it been proved that this explanation is the correct and only correct explanation of MOTION, TIME and SPACE?

There have been and are skeptics. Doubt was expressed by the competent relativist mathematician, H. Minkowski, in 1908 that Newtonian mechanics REQUIRES a STATIONARY space. Minkowski (1) considered that the invariance of the equations of Newtonian mechanics REQUIRES a uniform translation of space AT LEAST as much as it REQUIRES space to be stationary. He commented that the alternative possibility "is probably treated with disdain so that with untroubled minds we may overcome the difficulty of never being able to decide from physical phenomena, whether space, which is supposed to be stationary, may not after all be in a state of uniform translation".

The two fundamental postulates of the Reciprocal Space-Time Theory of D. B. Larson (2) REQUIRE space to be in a state of UNIFORM TRANSLATION or INCREASE with PROGRESSING, INCREASING three-dimensional time. The expansion of space with time is the essential cause of the expanding universe, alluded to by Hubble's law of the recession of the galaxies. The recession was found by Hubble to proceed at rates directly proportional to the distances of galaxies apart from each other.

How can the Newton-Einstein assumption of STATIONARY space-time explain the expanding universe when the theorists did not anticipate the expansion and furthermore imply that SPACE-TIME must be a CONTINUUM?

If MOTION essentially is, as Larson (2) postulates, an inverse or reciprocal RELATION OF SPACE TO TIME or TIME TO SPACE, then no one presently is doing more to show that the traditional IMMOVABLE SPACE-TIME CONTINUUM is incongruous with the nature of MOTION than Allen D. Allen (3,4). His theory of MOTION implies that SPACE is capable of MOVING in the same way as a material object moves. Specifically, a bounded, noncountable set of velocity points is mapped into position space, producing a generalized transformation term that yields Doppler's equation in one-space and the Lorentz transformation in two-space. In Allen's model of MOTION causality depends on the expanding of the cosmos.

In his papers (3,4) Allen shows that space-time (in both the specious sense and the hard physical sense) is NOT continuous in the classical sense of being dense. He also finds that space is not discrete in the sense of being the OPPOSITE of dense (uncountably infinite). Rather, the STRUCTURE of space is completely DIFFERENT from what one would imagine under the intuitions of Zeno, Cantor, etc.

Allen (3) refutes the proof that all line segments have the same number of points regardless of their finite lengths. Since this is the essence of dense (uncountably infinite) set, the Allen theory of motion just does not have CONTINUOUS space in the usual sense. However, neither is space discrete in the USUAL SENSE. If anything, the Allen theory demonstrates that these are NOT the only two choices.

(1) H. Minkowski. "On Space and Time". 1908 Reprint of 1923 English translation in Principles of Relativity. Dover Publications

(2) D. B. Larson. Quasars and Pulsars. North American Publishers. 1971.

(3) A. D. Allen. "Correcting the concept of denseness for the bootstrap", Int. J. Theor. Phys. 9, 4, 1974, pp. 219-224

(4) A. D. Allen. "Physical bases for a new theory of motion", Found. Phys 4, 3, 1974 (in press)

(See précis of Allen theory of MOTION in June, 1974 INTELLECTUAL DIGEST)

THE QUESTION BOX

by Ronald W. Satz
Room 102
1202 Commonwealth Ave.
Allston, Mass. 02134

(Mr. Satz has assumed the responsibility of conducting and editing this feature. He is particularly competent, as a member and secretary of New Science Advocates, to tackle questions about the Reciprocal System of physics, proposed by Dewey Larson, having written an introduction to Larson's work, The Unmysterious Universe. Send your question to him at the above address. Satz has been taking subjects beyond the master's level at M.I.T.)

Question: In deriving the gravitational formula Mr. Larson assumes the low velocity force formula, F = ma. What is the correct expression for high velocities? -- Todd Kelso, Prairie Village, Kansas.

Answer: The appropriate equation now will be developed and stated and then some conclusions drawn.

1. In the Reciprocal System mass is a scalar constant and deductions from the postulates lead to the Lorentz transformations. Thus, the force transformations may be applied not only to charged particles governed by Coulomb's law, but also to mass particles governed by Newton's law.

2. Consider a particle of mass m_1 situated at the origin of an inertial reference system, xyz or S, such that the velocity of m_1 is v in the direction of the x- axis. Consider a second mass m_2 situated at the location x,y,z in S and moving with a velocity u, whose components in S are U_x, U_y, U_z.

What is the gravitational force of attraction between m_2 and m_1?

The steps of the procedure for computing the force will be only outlined because of space limitations.

a. Write the velocity transformations of u from a second inertial reference system, S^1 or $x^1y^1z^1$ (in which m_1 is fixed at the origin) to the initial inertial reference system, S.

b. Write the force transformations from the reference system, S^1, to the reference system, S.

c. Combine the results so that all quantities are expressed in terms of the inertial reference system, S.

d. The final result yields the force along the line connecting the particles m_1 and m_2.

$$F = \frac{Gm_1m_2\sqrt{(z^2 + y^2)\left(1 - \frac{v^2}{c^2}\right) + \left[Lx + \frac{v}{c^2\left(1 - \frac{vux}{c^2}\right)}\left\{Lx\left(u_x - v + \frac{yu_y}{L} + \frac{zu_z}{L}\right)\right\}\right]^2}}{\left(\sqrt{L^2x^2 + y^2 + z^2}\right)^3\left[1 + \frac{v}{c^2}\left(\frac{u_x - v}{1 - \frac{vu_x}{c^2}}\right)\right]}$$

where $L = \dfrac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$

e. For low velocities the above equation takes on the more usual form of Newton's law:

$$F = \frac{Gm_1m_2}{r^2} \qquad (2)$$

In our environment velocities are ordinarily very low, and so the usual form of Newton's law works fine. However, in some cases deviations will be noticeable, as in the case of turbulent galaxies.

3. For the situation of a planet and the sun, the above formula can be considerably simplified. Let v be the velocity of the planet and let $u_x = u_y = u_z = 0$ (since the sun is assumed to be fixed in the reference system, S). Let the sun be located at distance y from the planet with the other coordinates $x = z = 0$. Then the gravitational formula (1) reduces to

$$F = \frac{Gm_1m_2}{y^2\sqrt{1 - v^2/c^2}} \qquad (3)$$

For convenience in the following discussion let $y = r$, $v = r\dot{\phi}$, the velocity of the planet with reference to the sun; and $m_2 = M$ (the mass of the sun), where ϕ = angular displacement and $\dot{\phi}$ = time rate of angular displacement.

4. In spherical coordinates, $r\phi\theta$, the motion of a planet of negligible mass around the sun is described by the following three equations:

$$\ddot{r} - r\dot{\theta}^2 - r\dot{\phi}^2\sin^2\theta = -GM/r^2\sqrt{1 - \phi^2r^2/c^2}$$

$$\frac{1}{r}\frac{d}{dt}(r^2\dot{\theta}) - r\dot{\phi}^2\sin\theta\cos\theta = 0$$

$$\frac{1}{r\sin\theta}\frac{d}{dt}(r^2\sin^2\theta\,\dot{\phi}) = 0$$

5. Planetary motion essentially is a planar motion; let it be in the plane of $\theta = \frac{\pi}{2}$; then $\dot{\theta} = 0$. Therefore,

$$\ddot{r} - r\dot{\phi}^2 = -\frac{GM}{r^2\sqrt{1-\frac{\dot{\phi}^2 r^2}{c^2}}}$$

$$\frac{d}{dt}\left(r^2\dot{\phi}\right) = 0$$

6. Then it follows that $r^2\dot{\phi}$ = constant = h and $\frac{d}{dt} = \frac{h}{r^2}\frac{d}{d\phi}$

The equations of motion consequently transform as follows:

$$\dot{\phi}^2\frac{d^2r}{d\phi^2} + r\dot{\phi}^2 = \frac{GM}{r^2\sqrt{1-\frac{\dot{\phi}^2 r^2}{c^2}}}$$

$$\dot{\phi}^2 r^2\frac{d^2}{d\phi^2}\left(\frac{1}{r}\right) + \frac{r^2\dot{\phi}^2}{r} = \frac{GM}{r^2\sqrt{1-\frac{\dot{\phi}^2 r^2}{c^2}}}$$

Change variable r with $s = \frac{1}{r}$.

$$\frac{d^2s}{d\phi^2} + s = \frac{GM}{h^2\sqrt{1-\frac{h^2s^2}{c^2}}} \qquad (4)$$

(4) is the orbital equation of a planet, deduced from the principles of the Reciprocal System. The orbital equation of Newton is

$$\frac{d^2s}{d\phi^2} + s = \frac{GM}{h^2} \qquad (5)$$

The orbital equation of Einstein is

$$\frac{d^2s}{d\phi^2} + s = \frac{GM}{h^2} + \frac{3GMs^2}{c^2} \qquad (6)$$

7. Equation (4) from the Reciprocal System may be expanded in a binomial series and compared with the Einstein equation (6):

$$\frac{d^2s}{d\phi^2} + s + \frac{GM}{h^2} + \frac{GMs^2}{2c^2} + \frac{3}{8}\frac{GMh^2s^4}{c^4} + \ldots. \qquad (7)$$

8. Let the right-hand terms in each of the orbital equations be denoted by N(s). Robertson in Relativity and Cosmology shows that for any gravitational theory the advance of the perihelion of a planet is given by

$$P = 1 - \sqrt{1 - \left(\frac{dN}{ds}\right)_{s0}}$$

or for small $\left(\frac{dN}{ds}\right)_{s0}$,

$$P = \frac{1}{2}\left(\frac{dN}{ds}\right)_{s0} ,$$

where the circular orbit $s = s_0$ is given by the root of the equation $s = N(s_0)$. As the planet advanced through θ radians in its orbit, its perihelion advances through $P\theta$ radians. Since N is not a function of s in Newton's equation (5), that equation predicts no perihelion advance. However, both the equation (4) of the Reciprocal System and Einstein's equation (6) predict such an advance.

9. For the Reciprocal System:

$$\left.\frac{dN}{ds}\right|_{s_0} = \left.\frac{d}{ds}\left[\frac{GM}{h^2}\left(1-\frac{h^2s^2}{c^2}\right)^{-\frac{1}{2}}\right]\right|_{s_0}$$

$$= \left.\frac{GM}{h^2}\left(-\frac{1}{2}\right)\left(1-\frac{h^2s^2}{c^2}\right)^{-\frac{3}{2}}\left(-\frac{2h^2s}{c^2}\right)\right|_{s_0}$$

$$= \left.\frac{GM}{c^2}\left(1-\frac{h^2s^2}{c}\right)^{-\frac{3}{2}} s\right|_{s_0}$$

The velocity of Mercury (mean or the equivalent velocity of a circular orbit) is 29.8 miles/second; thus the term

$$\left(1-\frac{h^2s^2}{c^2}\right)^{-\frac{3}{2}} = .999999974$$

and so may be taken as 1.

Note also that for a circular orbit,

$$GM\big|_{s_0} = \frac{v^2}{s_0}$$

Therefore:

$$\left.\frac{dN}{ds}\right|_{s_0} = \frac{v^2}{s_0 c^2}\, s_0 = \frac{v^2}{c^2}$$

$$\therefore P = \frac{1}{2}\frac{v^2}{c^2}\, 2\pi = \pi\frac{v^2}{c^2} \qquad (8)$$

for each revolution. This is the equation that Mr. Larson deduced from logic alone in Beyond Newton and it is the equation that Prof. F. H. Meyer used in his paper, "A Simple, Accurate Method for Computing Planetary Perihelion Precession."

10. Although for the planets both the Reciprocal System and Relativity give nearly the same results, the situation should be quite different for the "peculiar galaxies." The high velocities of the stars will alter the gravitational effect. As observation and equipment improve, we should be able to determine which gravitational equation is more in harmony with physical reality. Of course, the situation with regard to gravitation in the quasars has already been thoroughly considered by Mr. Larson in Quasars and Pulsars.

"Nor is time a mysterious illusion of the intellect. It is an essential feature of the universe."

G. J. Whitrow. Natural Philosophy of Time, p. 313.

LETTER TO EDITOR

Editor, RECIPROCITY

Dear Sir:

I have read with great interest a copy of RECIPROCITY sent to me recently and would like to continue receiving information about the Larsonian World view as it becomes available. Although I am quite cognizant of the many failings of existing theories, I am also quite aware of the many successes they have enjoyed and find it extremely difficult (though not impossible) to consider the idea that new developments will proceed from entirely different premises. However, in the true spirit of science I wish to keep an open mind on the matter and consider this possibility.

Thank you.

Sincerely,

Dr. Francis A. Gangemi
Chairman, Department of Physics
Ohio Northern University
Ada, Ohio 45810

HOW IT IS WITH RECIPROCITY

To realize the full potential of our science newsletter, RECIPROCITY should grow and is growing. Its essential purpose for being is to promote a thorough and continuing investigation and advocacy of the scientific theory of Mr. Dewey Larson of Portland, Oregon. The theory is named the Reciprocal System, since its originality includes the affirmation that the physical universe is a universe of motion, not a universe of matter, and that the essence of all motion is a reciprocal relation between time and space.

In the next issue of RECIPROCITY we intend to discuss plans afoot to test the Reciprocal System on one of its most important explanations: its theory of the basic repulsive and attractive forces involved in the cohesion of solid matter.

Our organization, New Science Advocates, desires to stimulate old readers and seeks to win new readers of RECIPROCITY. We have to offer the search for and the cultivation of old and new truth about the nature and structure of the universe in its whole and in all its parts. If a thousand old beliefs were ruined in our walk to truth, we should still walk on. One of the sublimest things in the world is plain truth. There are many other truths about truth. "My way of joking is to tell the truth", Bernard Shaw said, "It's the funniest joke in the world."

There is no fixed subscription price for RECIPROCITY. But that does not mean the science newsletter is free. There ain't no such thing as a free lunch. Printing and mailing the newsletter cost money.

Some people have lots of money, others have none. If you want RECIPROCITY, we'll be glad to send it to you. If you want to help with the costs, we will appreciate that--this is our way. Make it work.

We can always use help. Specific skills are presently needed:

A Wisconsin attorney to develop the incorporation of New Science Advocates for the optimum attainment of third class bulk mailing privilege for RECIPROCITY.

Writers to send a flood of questions for subsequent answers in the Question Box feature, to do interviews, research and put together articles.

An accountant to keep records of money income and outgo, keep accounts straight and keep us solvent.

A person to keep the mailing list updated and filed correctly.

We have a backlog of fine contributions from readers that will be subsequently printed and/or summarized. Limitations of space in the current format of RECIP-ROCITY restrict publishing all the material in each issue that the Editor would like. Please don't be dissuaded from sending Letters to the Editor, articles, notices of scientific meetings and local gatherings where issues pertinent to the investigation of the Larsonian Reciprocal System are raised and/or discussed. Every science newsletter becomes largely what its readers make of it. The Editor welcomes your critical comment and constructive suggestions.

A reader, Mr. Steve Berline, believes that there may be little understanding of the theory of Larson, even among the readers of RECIPROCITY. Mr. Berline has constructed a test which, he believes, is designed to discover whether his above conjecture is correct. The Editor would like to hear from RECIPROCITY readers your opinion of this idea of Mr. Berline and whether you would be personally interested in taking such a test. If enough of you think the project worthwhile, the Editor and associates will consider publication of the test in a subsequent RECIPROCITY issue.

EDDINGTON ON de SITTER VS EINSTEIN PHYSICS

G. Windolph of New Science Advocates has made the following interesting comment about the relations of the cosmologies of Albert Einstein and Willem de Sitter to Larson's Reciprocal System:

".....the extreme de Sitter model seems to be very much like Larson's before any displacements are introduced. I found an interesting paragraph in Eddington's book, 'The Expanding Universe' (Ann Arbor Paperback 1958; U. of Michigan Press):

"'The situation has been summed up in the statement that Einstein's universe contains matter but no motion and de Sitter's contains motion but no matter. It is clear that the actual universe containing both matter and motion does not correspond exactly to either of these abstract models. The only question is, Which is the better choice for a first approximation? Shall we put a little motion into Einstein's world of inert matter, or shall we put a little matter into de Sitter's Primum Mobile?' (p. 46)"

Also Eddington: "The intermediate solutions of Friedman and Lemaitre are 'expanding universes' Both the material system and the closed space, in which it exists, are expanding." (G. Windolph's underlining)