From Galileo to Lorentz…and beyond

Joseph Levy
4 Square Anatole France
91250 St Germain lès Corbeil
FRANCE
E.mail josephlevy1@compuserve.com

Until the middle of the twentieth century, the orthodox approach of relativity theory was considered by the majority of physicists as a chapter of physics above all suspicion. Most of them were convinced that the relativity principle was an unquestionable concept of physics; in other words, the laws of physics should assume the same mathematical form in all inertial frames.
We must add that the speed of light was always found to be C, and the method of measurement of this speed was not called into question (at least by the majority of the leading physicists). Finally the two basic postulates of special relativity were considered as settled.
Moreover, the influence exerted by the applications of the theory on industry and on the life of individuals was so deep, that it seemed unwise to contest a theory which had permitted such results.
Nevertheless, when we examine the development of science through the centuries, we remark that a number of theories which had been considered above all suspicion when they were formulated were demonstrated later to have certain limitations. This was the case for Aristotelian physics, Ptolemean cosmology, classical mechanics and Newtonian cosmology among others.
As can be seen in the book which bears the same title as this text [1], relativity theory is not beyond such limitations. More than his followers, Einstein was aware of this: let us bear in mind that in a letter sent to his friend Maurice Solovine (1949) he wrote: “You imagine that I regard my life’s work with calm satisfaction, but a close look yields a completely different picture. I am not convinced of the certainty of a simple concept and I am uncertain as to whether I was even on the right track”.
From the middle of the twentieth century, some unconventional physicists [2] began to call into question the measurement of the speed of light. They demonstrated that, even when one uses two clocks to carry out the process, the synchronization methods utilized (Einstein-Poincaré procedure or slow clock transport) make sure that, paradoxically, what one really measures is the round trip velocity (two way speed of light).
At the same time, some weighty experimental arguments were advanced in favour of the anisotropy of the one-way speed of light. Although the direct determination of this velocity comes up against major difficulties, several authors applied themselves to measuring it indirectly from the anisotropy of the red shift of many distant galaxies [3], from the anisotropy of the 2.7° K microwave background [4], or from the muon flux anisotropy [5].
We must add the experiments of Marinov (coupled mirrors experiment and toothed wheels experiment) [6].
All these experiments proved in agreement with one another. They demonstrated the existence of a fundamental non dragged aether frame, whose absolute speed is zero, but whose relative speed with respect to the Earth frame is of the order of 300 Km/sec.
As a consequence, the question of the compatibility of this aether frame with the relativity principle began to preoccupy a larger and larger number of physicists. We know that Poincaré had already tried in his time to reconcile the relativity principle with the existence of a

privileged aether frame. Prokhovnik followed the same path but with a different methodology; but all these attempts failed.
There is no doubt today that we must choose between the existence of a privileged aether frame and the relativity principle.
In addition to the experimental arguments, we have developed different theoretical arguments in favour of the fundamental non dragged aether frame [1]. Finally the relativity principle can no longer be considered as an absolute concept of physics (although it keeps a certain validity in different experimental situations).
As a corollary of the giving up of the relativity principle, length contraction and clock retardation appear to be real and non reciprocal processes. For example, a ruler in motion with respect to the fundamental frame contracts, but a ruler at rest in the fundamental frame is not affected by the motion of bodies. Starting from these considerations, we were led to reconsider the Lorentz-Poincaré transformations, and to derive a set of space-time transformations in agreement with the new data. Since the measurements in any inertial frame are made with contracted meter sticks and retarded clocks, using moreover an unreliable clock synchronization procedure, we were brought to realize that all the measurements of distance time and velocities in frames moving with respect to the Cosmic Substratum are distorted. So that the experimental space-time transformations connect fictitious data. They are nevertheless useful because we need them to disclose the hidden variables they conceal, which, as can be seen in ref [1]are the real space-time transformations.
The experimental extended space-time transformations we have derived are more general than the Lorentz-Poincaré transformations [7]. They assume the same mathematical form as these relations when one of the frames under consideration is the fundamental inertial frame, but (since the relativity principle is demonstrated to be invalid) they take another form when the frames connected are any pair of inertial frames. After correction of the systematic errors of measurement mentioned above, the hidden variables they conceal are brought to the fore.
The agreement of our approach with known theoretical and experimental data can be checked. Indeed the extended space-time transformations possess the following properties:
-they enable to explain why the speed of light is paradoxically always found to be constant although it is actually anisotropic,
-they reduce to the Lorentz-Poincaré transformations when one of the frames under consideration is the aether frame,
-it is today recognized that conventional relativity leads to inconsistencies, which are analysed in ref [1]. The present approach permits one to overcome these inconsistencies.
The new developments that concern relativity theory, will have noticeable influence in all of physics.

Acknowledgements:
We would like to thank Pr. Jean Pierre Vigier who kindly offered to read and comment on our book "*From Galileo to Lorentz and beyond*", during his stay in Canada, at the end of the year 2002. We are grateful to him for the complete support he gave to our work.

References

[1]-J. Levy, *From Galileo to Lorentz and beyond*, (Principles of a fundamental theory of space and time), Apeiron Ed, 4405 Rue St Dominique, Montreal, Quebec Canada, H2W 2B2, E. mail Apeiron@vif.com Web Site http://redshift.vif.com
-Extended space-time transformations for a fundamental aether theory, Proceedings of the P.I.R.T conference 2002, Imperial College, London, M.C. Duffy Chairman.

[2]-G. Builder, Aust J Phys, 11 (1958 a) p 279, 11 (1958 b) p 457, Philosophy Sci, 26 (1959) p 135.
-S.J. Prokhovnik, *The logic of special relativity*, Cambridge University Press, (1967).

[3]-G. de Vaucouleurs and W.L. Peters, Nature, 220 (1968) p 868.
-V.C. Rubin et al, Astron J, 81 (1976) p 687-719.

[4]-E.K. Conklin, Nature, 222 (1969) p 971.
-P.S. Henri, Nature, 231 (1971) p 516.
-G.F. Smoot et al, Phys rev lett, 39 (1977) p 898.
-M.V. Gorenstein and G.F. Smoot, Astrophys J, 244 (1981) p 361.
-R.B. Partridge, Rep prog phys, 51 (1988) p 647.

[5]-C. Monstein and J.P. Wesley, Apeiron, 3 (1996) p 33.

[6]-S. Marinov, Spec sci tech, 3 (1980 a) p 57.
-*The thorny way of truth*, East West, Graz, Austria, (1984), Gen Rel Grav, 12 (1980) p 57.
-J.P. Wesley, *Selected topics in advanced fundamental physics*, Benjamin Wesley Ed, Blumberg 7712, Germany, (1991).

[7]-The extended space-time transformations we have derived are in complete agreement with Selleri's inertial transformations, but our methodology is quite different and brings to the fore other consequences. For example, our approach discloses the hidden variables the transformations conceal. The mathematical form of the extended space-time transformations is also different from the inertial transformations, because they are based on the Einstein-Poincaré synchronization procedure, whereas the inertial transformations are based on an exact synchronization of clocks in he Earth frame, which is ideal but not usual, and would be difficult to carry out.
-F. Selleri, *Lezioni di relativita*, Ed Progedit, Bari, Italy, March 2003.

In physics, a Galilean transformation is used to transform between the coordinates of two reference frames which differ only by constant relative motion within the constructs of Newtonian physics. These transformations together with spatial rotations and translations in space and time form the inhomogeneous Galilean group (assumed throughout below). Without the translations in space and time the group is the homogeneous Galilean group. The Galilean group is the group of motions of Galilean relativity Author of From Galileo to Lorentz-- and beyond.Â From Galileo to Lorentz-- and beyond. by Joseph LÃ©vy 1 edition - first published in 2003. Subjects. Space and time. Lists. Add to List. Are you sure you want to remove Joseph LÃ©vy from your list? Links (outside Open Library).