Information Relativity Theory of Everything

A brief summary

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Abstract

In this short note I present a brief summary of the philosophical bases, axioms, transformations, and main results and predictions, of a recently proposed relativity theory termed Information Relativity theory (or IR).

1. Philosophical basis

The theory is epistemic (much like the epistemic approach in quantum mechanics). It defines relativity, not as a true state of nature (as in Einstein's relativity"), but rather as *difference in information between observers who are in relative motion with respect to each other*.

2. Theory Axioms

The theory rests on the two following propositions:

1. The laws of physics are the same in all inertial frames of reference (*relativity axiom*).
2. Translation of information from one frame of reference to another is performed by a carrier with velocity v_c (*information-carrier axiom*).

A self-evident assumption is that the velocity of the information carrier should be higher that the relative velocities between the system's frames of reference.

For relevant applications to high energy particles and to cosmology, the information carrier is taken to be light or electromagnetic waves with comparable velocities ($v_c = c$).

3. Transformations

For the case of two frames of reference moving with respect to each other with constant velocity v ($v < v_c$), the theory's resulting transformations (see [1]) are depicted in Table 1.

Table 1
Information Relativity Transformations

Physical Term	Relativistic Expression	
time	$\frac{t}{t_0} = \frac{1}{1-\beta}$	.... (1)
distance	$\frac{x}{x_0} = \frac{1+\beta}{1-\beta}$	…. (2)
mass density	$\frac{\rho}{\rho_0} = \frac{1-\beta}{1+\beta}$	.... (3)
Kinetic energy density	$\frac{e_k}{e_0} = \frac{1-\beta}{1+\beta}\beta^2$	... (4)

(In the table the variables $t_0, x_0,$ and ρ_0 denote measurements of time, distance and mass density at the rest frame, respectively, $\beta = \frac{v}{v_c}$, and $e_0 = \frac{1}{2}\rho_0 c^2$).

4. Main Results and Predictions

In reference [1] I show that IR accounts well for small particles' dynamics, including the Michelson-Morley's "null" result, the Sagnac effect, and the neutrino velocities reported by OPERA and other collaborations.

In reference [2] I apply the theories transformations, with no alteration or addition of free-parameters, to cosmology. I show that IR is successful in accounting for several cosmological findings, including the pattern of recession velocity predicted by inflationary theories, the GZK energy suppression phenomenon at redshift z~1.6, and the amounts of matter and dark energy reported in recent ΛCDM cosmologies.

In reference [3] I show that IR, despite being a deterministic and local ("non-spooky"), accounts, both qualitatively and quantitatively, for entanglement in a bipartite preparation like the one described in the famous EPR paper.

In reference [4] I extended the analysis in [3] and showed that the theory is successful in explaining, both qualitatively and quantitatively, the matter-wave duality, quantum criticality and phase transition, as well as the formation of Bose-Einstein Condensates.

In reference [5] I use Information Relativity theory to solve the Twin Paradox symmetrically.

References

[1] Information Relativity Theory and its Application to Time and Space.

http://vixra.org/abs/1504.0154

[2] Relativity Theory and Its Application to Cosmology.

http://vixra.org/abs/1505.0110

[3] If God Plays Dice, Must We do the Same? Quantum Entanglement as a Deterministic Phenomenon.

http://vixra.org/abs/1505.0147

[4] God Does Not Play Dice: Matter-Wave Duality, Quantum Phase Transition and Bose-Einstein Condensate as Deterministic and Local Phenomena.

http://vixra.org/abs/1506.0076

[5]. Information Relativity Theory Solves the Twin Paradox Symmetrically.

http://vixra.org/abs/1404.0083