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Fireballs of GRBs and Lorentz-Interpretation (LI) of GRT

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Abstract

LI of GRT has a close connection to Higgsfields which has consequences for explaining fireballs of GRBs [1]. LI of GRT expands GRT, s. chapter 20 of [1]. Counterarguments [2]. Main differences with GRT (though using the same formulas):

(a) Free falling particles decrease their rest mass, loose it when reaching the event horizon and because of that become a wave, s. formula

$$E_G = mc^2\left(1-\frac{2GM}{c^2 r}\right)^{1/2} \quad (2)$$

of [2]. This means: While Higgsfields *give* elementary particles a rest mass, gravitational fields *take* rest mass *away*.

(b) Gravitational fields only exist if there are particles with rest mass $\neq 0$.

(c) Black holes only exist as a limiting case.

Contrary, within classical GRT:

(a) the rest mass of a free falling remains constant,

(b) gravitational fields depend on total energy independent of a rest mass and

(c) black holes are real objects having an event horizon.

Assume a collapsing dust star reaching the event horizon. Then, by assumptions (a) and (b) of LI of GRT all the particles loose their rest mass, become waves and all together form a fireball with zero rest mass at $t=0$ which by assumptions (b) and (c) of LI of GRT expands. This is the (over)simplified idea of fireballs of GRBs seen by LI of GRT and needs more explanation in the talk.

Main aim is to show possible consequences for astronomical observations of high energy, e.g. fireballs of GRB's.

Main part

This talk lists two main differences between classical GRT and LI of GRT possibly helpful to solve astronomical problems at high energies, e.g. simulations of supernovae, fireballs of jets of AGN's or binaries and of GRB's. Classical GRT and LI of GRT have in common the same formulas and similar first principles, s. chapter 20 of [1] but the interpretation of its formulas becomes different.

The **first main difference** between classical GRT and LI of GRT concerns the well known objects named Black Holes. In LI of GRT there are no black holes, black holes are theoretical limiting cases only. Similar to clocks which are slowed down in gravitational fields [2] measuring rods contract, s. chapter 20 of [1]. So $r_{measured} \to r_{SM}$ means $r_{real} \to 0$, in words: astronomical objects which are close to black holes with a measured circumference $U \approx 2\pi r_{SM}$ are objects with $r_{real} \approx 0$. Objects with $r_{real} = 0$ and infinite density are not allowed by quantum theory, they become degenerated objects like white dwarfs or neutron stars. This is in agreement with the Oppenheimer-Volkhoff equation in the version of LI of GRT, s. chapter 21.5 of [1].

Firstly, this has energetical consequences when simulating supernovae, jets of AGN's etc. since now it does not matter how the star collapses or how matter is accreted: no energy is lost in a black hole. There is no black hole which keeps everything but there is some degenerated object which can emit matter and radiation. Secondly,

degenerated objects are allowed to have even very strong magnetic fields. These are necessary to build up jets and it is not so clear whether the magnetic fields of the accretion disks suffice.
To be more concrete. Possibly jet models similar to those of Caminzad and Fendt [3] are transferable from neutron stars to Black Holes of AGN's.
The **second main difference** between classical GRT and LI of GRT perhaps helpful to explain highly energetical astronomical observations depends on formula (2) of [2]

$$E_G = mc^2\left(1-\frac{2GM}{c^2 r}\right)^{1/2} \tag{2}$$

E_G : total energy or rest mass times c^2 of a particle resting in the gravitational field. Article "GRT - well proven and also incomplete. Further arguments" [4] also proves that while E_G of a free falling particle remains constant its rest mass $m(r)$ decreases similar to (2) by

$$m(r) = m\left(1-\frac{2GM}{c^2 r}\right)^{1/2}$$

Since $m(r) \to 0$ for $r \to r_{SM}$ one may say that the particle becomes a wave. This is rational. Since Higgs bosons are detected [5] now one may say that Higgs fields give particles rest mass or in other words transform waves to particles. Gravitational fields do the contrary, following formula (2) they decrease the rest mass of a particle and transform it to a wave when it is reaching the event horizon.

$$v_{measured} \to c$$
$$\gamma_{measured} \to \infty$$

The hypothetical new idea: If many particles are converted to waves at the same time when reaching the event horizon then their reflection at the gravitational center results quite naturally in an expanding fireball. The observed high values of γ e. g. during GRB's become convincing.
What is true for single particles remains true for a shell of particles with the same energy free falling in the gravitational field of some star. Now assume a collapsing dust star. You will get this situation if a star has consumed all its fusion fuel and only gravitational forces will remain. Every shell of the star is attracted by all its inner shells, the outer shells have no effect to the inner ones on account of Birkhoff's theorem, s. Fig. 22.1 of [1]. All the shells reach $r_{real} = 0$ asymptotically and the measured radius becomes approximately $r_{measured} = r_{SM}$ with r_{SM} defined by the mass of the inner shells. If they would reach $r_{real} = 0$ then they would reach their event horizon, too and all the particles would loose their rest mass and become a wave. The wave energy then is the same as that of the particle before. Since nearly no particles with rest mass $\neq 0$ would remain there are no gravitational forces any longer (in LI of GRT gravitational forces rely on rest mass $\neq 0$, s. chapter 21.1 of [1]). So you have a fireball at $r = 0$ of finite total energy but infinite density. It expands with $\gamma_{measured} \approx \infty$ and exceeds $\gamma \geq 1000 - 10000$ of GRB's. Later, on account of the Higgs fields the waves become particles with rest mass $\neq 0$ again. At least two larger questions remain. 1.) $r_{real} = 0$ is reached only asymptotically and 2.) what are the precise formulas?
The more precise formulas of a collapsing dust star are discussed e. g. in chapter 22 of [1]. Problem 1.) is solved by quantum theory. r_{SM} is reached asymptotically and $r_{real} \approx 0$. This means on account of quantum theory that the probability to become a wave is not 1 but ≈ 1. Therefore, these considerations remain valid in principle but up to now it is not a theory.

Summary

In LI of GRT (a) black holes are a limiting case only and (b) gravitational forces change the rest mass of a particle (formula (2) above). It is illustrated that this possibly is helpful to explain fireballs of jets and GRB's.

Some explanations and details

LI of GRT relies on classical GRT, e. g. on its derivation of the important formula

$$E_G = mc^2\left(1 - \frac{2GM}{c^2 r}\right)^{1/2}$$

LI of GRT is conform to mainstream physics especially quantum field theory and theory of elementary particles.

To understand the ideas of this talk you should know about [1] and the talk „GRT - well proven and also incomplete?“ [2] .

[1] proves that LI of GRT is a sound theory compatible with classical GRT. In fact, LI uses the same formulas and an equivalence principle only a little bit different from that of classical GRT. LI just expands GRT by the assumption that clocks and measuring rods contract in gravitational fields and curved spacetimes remain necessary for illustration and mathematical definitions, s. fig. 1 in [2].

The talk [2] proves a further fact: GRT has two contradictious energy formulas and LI of GRT gives some solution. The main consequence:

$$E_G = mc^2\left(1 - \frac{2GM}{c^2 r}\right)^{1/2}$$

describes how the rest mass of a particle in a gravitational fields depends on position *r*. Higgsfields behave similarly and this talk evaluates some putative consequences for the fireballs of GRBs.

Fireballs of GRBs, jets of AGN, supernova simulations are unexplained by classical GRT. Possibly, LI of GRT shows a different way to get a solution.

It is no simple task to prove this. Therefore the author recommends research funds to institutes for scientific contributions in this field.

Literature

[1] J. Brandes, J. Czerniawski: *Spezielle und Allgemeine Relativitätstheorie für Physiker und Philosophen - Einstein- und Lorentz-Interpretation, Paradoxien, Raum und Zeit, Experimente,* 2010 Karlsbad: VRI, 4. erweiterte Auflage, 404 Seiten, 100 Abbildungen, ISBN 978-3-930879-08-3 Näheres (Preis, Inhaltsverzeichnis etc.): http://www.buchhandel.de/ oder http://www.amazon.de/ Suchen mit 9783930879083

[2] „GRT - well proven and also incomplete?“ on this website www.grt-li.de

[3] Fendt, C., Camenzind, M.: *On collimated stellar jet magnetospheres.* Astronomy & astrophysics 313, 591-604, 1996

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