IJBPAS, April, 2015, 4(4): 2162-2165

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

THE RADIATION OR ABSORPTION OF THE GRAVITATIONAL WAVES

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ABSTRACT

In recent paper we have argued that the observed cosmological discussion about gravitational waves and deformation in spaces and so cosmological acceleration. We try to show that, the radiation (and absorption) the energy and gravitational waves can be describe by the "hyper singularity in space instead the black holes , and with compressed space cause a deformation in gravitation formula and the term $1/R$ must be correct.

INTRODUCTION

The non-linearity of the gravitational field is one of its most characteristic propagation in the spaces from an isolated source. Indeed , we must extract exact solutions of the Einstein vacuum field equations corresponding to several kinds of gravitational waves and then superposition of them that leads to creation of intrinsic singularities. This matter is certainly seem, even these solutions are global vacuum solutions from different sources and they may give us important information about how waves behave in asymptotical regions. What we can really understand to like to do are to be able to investigate gravitational waves from bounded isolated sources.

The most important things which we can abstract that are information about how gravitational waves behave about this singular regions .Since then , we would be in a position to discuss energy transfer with these singular regions and determines whether or not gravitational waves behave. In the same way as other forms of radiations and transfer of energy. We plan a model system for these transformations of radiations and absorption of energy of gravitational waves to ,or from of these singularities that include black hole and another phenomena that we named it " inverse singular regions of the universe".

Such a model system consists of perfectly possessing as much symmetry as possible, so equations of that field are easier to handle.

The simplest field due to these regions is spherically symmetric but corresponding to Birkhoff theory , it reveals that a spherically symmetric vacuums field is necessarily static and therefore spherically symmetric solutions cannot emit waves .So spherical symmetry assumes the existence of three spacelike Killing vector fields.

The next simplest starting assumption is to consider an region has non-rotating sources which is initially static and radiate (or absorb) for a finite period (for example pulsating symmetrically or even hyper symmetrically)and then returns to a static configuration.

After a period proper time , repeat again .this static form and then propagation repeating for a long time.one might expect that the non-linearity to cause the wave to interfere , back scatter and so excite the region (source of gravitation waves) causing it to radiate indefinitely.

The field equations of general relativity form of hyperbolic partial differential equations. It is very easily to sea that in an appropriate gauge, with linearized approximation, the equations solutions are simply wave equations.

As Bondi has pointed out, hyperbolic equations are very different in elliptical or parabolic equations, since they allow for "proper time solutions". These solutions which are initially static but then suddenly become dynamic . These bicharacters lie on privileged surfaces called characteristic hyper surfaces which play the role of wave front in the propagation of these effects . This is obviously, different solutions may meet continuously and defined as singular hyper surfaces for which usual Cauchy initial value problem cannot be solved.

For the vacuum field equations, we considering the Cauchy problem. Namely:

$$g^{11} g_{\alpha\beta,11} = 2M_{\alpha\beta}$$

The condition for the hyper surface $x^1 = cte$, to be a null hyper surface . The normal vector to such a hyper surface is null vector and is tangent to the hyper surface and is tangent to the light cone .This makes an idea that says in the linearized theory, namely , that gravitational distributions are propagate along null geodesics with speed of light . At the present, we introduce the coordinate hyper surfaces: $x^1 = u = cte$ is a family of non-intersecting null hyper surfaces. The normal covariant vector field to these surfaces is:

$l_a = \partial_a u = (1,0,0,0) = \delta^0_a$

And we obtain:

$$l_a l^a = g^{ab}\, \partial_a u\, \partial_b\, u = 0$$

And the vector field is both tangent and normal to the null hyper surfaces. The bicharacteristics are the orbits of the covariant vector field l^a. That is:

$$x^a = x^a(\rho)$$

$$\frac{dx^a}{d\rho} = l^a = g^{ab}\, \partial_a\, u$$

And then:

$$\frac{D}{D\rho}\left(\frac{dx^a}{d\rho}\right) = \frac{D}{D\rho}\,(g^{\mu\, b}\, \partial_a\, u\,)$$

$$= \frac{dx^c}{d\rho}\, \nabla_c\,(g^{ab}\, \partial_b\, u)$$

$$= g^{ab}\, \frac{dx^c}{d\rho}\, (\nabla_c\, \partial_b\, u)$$

$$= g^{ab}\, \frac{dx^c}{d\rho}\, (\nabla_b\, \partial_c\, u)$$

$$= g^{ab}\, g^{cd}\, \partial_d\, u\, (\,\nabla_b\, \partial_c\, u\,)$$

$$= \frac{1}{2}\, g^{ab}\, \nabla_b\,(\,g^{cd}\, \partial_c\, u\, \; \partial_d\, u\,) = 0$$

Note that, the bicharacteristics are null geodesics and ρ is an affine parameter. Second coordinate is $x^1 = r$ where r is a radial parameter along the null rays, and x^2 and x^3 is so the null rays . These coordinates are called Bondi or radiation coordinates. These coordinates are called Bondi or radiation coordinates.

The gravitational field is governed by the Riemann tensor. We have to insight into the possible types of gravitational field by considering the algebraic structure of the Riemann tensor. We consider vacuum case for simplicity where the Riemann tensor coincides with the Weyl tensor:

$$c_{abcd} = R_{abcd} - g_a\;{}_{[c}R_{d]b} + g_b\;{}_{[c}R_{d]a} - \frac{1}{3}\, g_a\;{}_{[d}g_{a]b}\; R$$

For the vacuum case $R_{ab} = R = 0$

We know the

Weyl tensor has same symmetries as Riemann tensor and for the free

Trace property, we have:

$C^a_{bac} = 0$

It turns out that these symmetries reduce the problem to classifying the root of a quartic equation These results called Petrov classification.

A different but equivalent method, due to Debere, consist in classifying certain null vectors , called principal null directions , which have a special relationship to the Riemann tensor .

The Petrov classification of the Weyl tensor is augmented by an analogous classification of the Ricci tensor called the Plebanski type. We can prove simply that with this introduction:

1) with a little manipulation of relation and mathematical calculations . We can prove that, Radiation and Absorption from a region of universe could be explain with blackhole or hyper singularity which is made from compressed space by gravitation. this compressed space could change the $1/R$

gravity. We explain this correction of $1/R$ gravity in the next paper.

ACKNOWLEDGEMENTS

We would like to thank Islamic Azad University, central branch for helpful protections.

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