Einstein Gravitation and Newton Gravitation

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Some people say a picture can convey a thousand words so this is a pictorial attempt to try to convey the differences between Einstein gravity and Newton gravity.

Speed of light is variable, although there are people who misrepresent it as constant.

Various terms are used -speed of light has to be considered in vacuum free of effects of fields et al then SR (Special Relativity) considers he scenario of it being constant, then such terms are used like local lightspeed.

In GR (General Relativity) lightspeed varies, being affected by gravity then it's talked of in terms of global lightspeed.

All of this just hides the fact that lightspeed is variable full-stop.

Newtonian gravitation theory is really just GR.

Newtonian gravity usually considers case of Euclidean geometry, then for gravitational force vectors of object such as the sun those vectors are pointed towards the centre of the sun.

GR starts off from considering what it calls flat spacetime has gravitational force vectors in parallel, and then if there is a centre of mass object such as the sun deforms space towards that point. Then because of the connection between space and time, the deformation or warping of space affects time, so we have space-time warpage.

GR then talks of faster than light in manner of Star Trek as spacetime warpage.

Newtonian physics just calls a spade a spade [1] and says its variable lightspeed.

Now will go into the pictures:

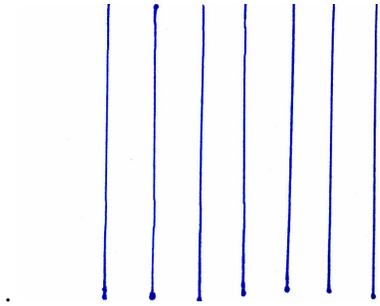In Fig 1 – lines of gravitational force are parallel pointing downwards.

Fig 1

In fig 2 an object has forward velocity, in this gravitational field of fig 1. The object will then have resultant velocity due to both its forward velocity and the force acting downwards, so it bends downwards.
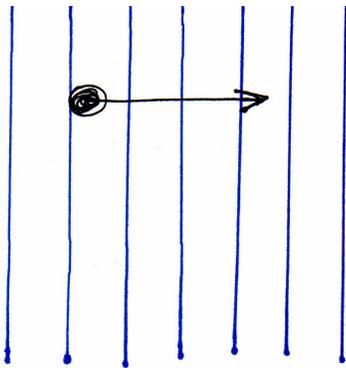

Fig 2

If we now consider a gravitational field like fig 3 where the lines of the gravitational force are pointing towards a common centre.
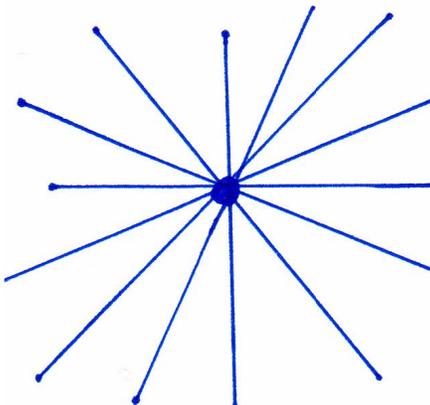
Fig 3

An object with forward velocity in this gravitational field of fig 3 will have different motion to an object of fig 2.
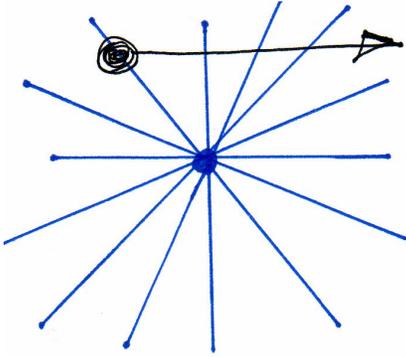

Fig 4

i.e. according to Newtonian physics the motion of these objects fig 2 and fig 4 are different.

Now the way that Einstein and Eddington erroneously proceeded was as follows – they treated Newtonian gravity as fig 2.

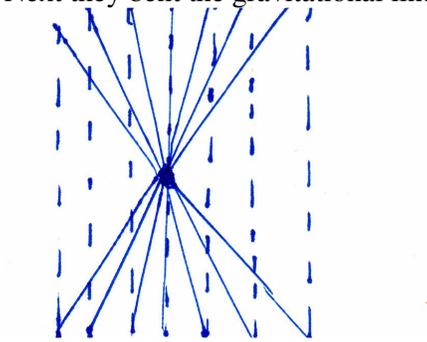Next they bent the gravitational lines of fig 2 as follows:

Fig 5

They then treated the object as moving in the gravitational lines of fig 5-
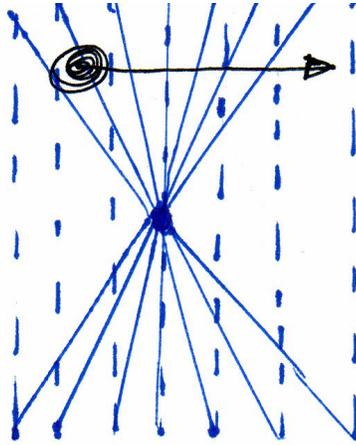
Fig 6

They then said that the bending of fig 6 is twice that of fig 2.

They called the bending due to fig 2 as Newtonian theory and the bending due to fig 6 as their GR.

The error they therefore made is to misrepresent Newtonian physics.

From Newtonian physics – as light passes by the sun, the gravitational field of the sun is as per fig 3, so the light particle is as per fig 4. They (Einstein and Eddington) erroneously think the setup is fig 2 i.e. they do their Newtonian physics wrong. By doing their Newtonian physics wrong, they then falsely claim that they have a different theory to Newtonian physics.

There are numerous things to note – in fig 4 which represents a light-particle passing by the sun's gravitational field, we are treating light as if it were any other type of object. i.e. the light obeys same sort of physics as any other object such as ball or bullet.

So when we consider light moving forward with velocity c and acted upon by a velocity due to gravity (v_g) as per fig 7 then it has a resultant velocity (v_R) whose magnitude is greater than c. i.e. in Newtonian physics lightspeed is variable.
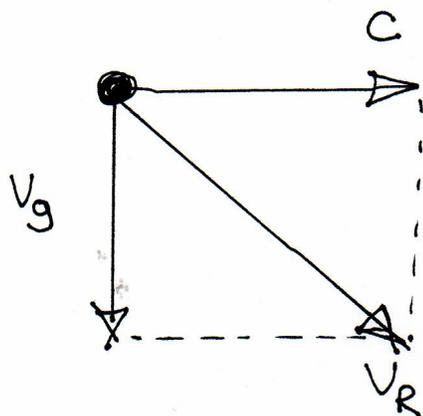
Fig 7

When Einstein and Eddington distort fig 1 to form fig 5 they are thinking in terms of non-Euclidean geometry – where Euclidean geometry of fig 1 is distorted by gravity (what they call spacetime warpage) to form fig 5. In the usual way of dealing with Newtonian physics we can deal with gravitational force lines in context of Euclidean geometry for this scenario as per fig 3.

By Poincare it is a matter of conventionalism as to what geometry we use. So ideally both fig 4 and fig 6 are Newtonian physics, except one uses Euclidean geometry and the other uses non-Euclidean geometry.

Einstein appears to have been working from Poincare when he was dealing with relativity; although he did not admit that because he gave no references in his 1905 SR paper, and he also was making mistakes when working from Poincare. Einstein ideally should have pointed out the conventionalism issue. But he did not and then made his mistake of misrepresenting his dealings with Newtonian physics.

Penrose says: "... we must remind ourselves what Einstein's general theory of relativity is all about. It is, after all, an extraordinarily accurate theory of gravity, where the gravitational field is described in terms of a curvature of space-time." [2] This is the transition from fig 1 to fig 4. The identification of the lines of the gravitational force are distorted from fig 1 to fig 4 and called "curvature of spacetime". In fig 1 it's what would be called flat spacetime and distorting those lines to fig 5 is what would be called curved spacetime. The gravitational field being able to be treated in the context of Euclidean geometry or non-Euclidean geometry. How much of this the likes of Penrose realise is difficult to say, because of the seduction around the myth of Einstein.

<u>Reference</u>

[1] from wiki: To "**call a spade a spade**" is to speak honestly and directly about a topic..." http://en.wikipedia.org/wiki/To_call_a_spade_a_spade 2011-01-24

[2] Cycles of Time, Roger Penrose isbn9780224080361 p 73

See also other articles such as: Frank Tipler's version of physics

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