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Geometrical Isomerism Of Celestial Bodies

Dr. Shobha Lal
Professor of Mathematics and Computing, Dean Faculty of Engineering and Technology, Jayoti Vidyapeeth Women's University, Jaipur, Rajasthan, India
E-mail- dean.fet@jvwu.ac.in

Abstract
Einstein's standard 1915 geometry-dynamics makes new predictions not only about the numbers but also about the nature of physics. He stated - the geometry of space is dynamics. The universe is closed. The universe starts its life unbelievably small, reaches a maximum dimension and recon tracts. Undergoes complete gravitational collapse. In many ways a similar gravitational collapse over takes certain stars with big dense cores. This collapse terminates in same cases ("super nova events") with the formation of a neutron star. In other cases, where the star core is more massive, the collapse goes to completion. A black hole is formed. Given such a black hole, one has no way, even in principle, of measuring or even defining - one believes - how many baryons and leptons this objects contains. In this sense one thinks of the law of conservation of baryons (and leptons) as being transcended in the phenomenon of complete collapse.
Key Words: *Collapse, Black hole, Special Theory of Relativity, Super Nova.*

1- INTRODUCTION

The opinion seems to have got abroad, that in a few years all the great physical constants will have been approximately estimated, and that the only occupation which will then be left to men of science will be to carry on these measurements to another place of Decimals". These words were pronounced by James Clerk Maxwell at the inauguration of the Devonshire (Cavendish) Physical Laboratory at Cambridge(1). Decades later Albert's A. Michelson made the idea of "the search for the next decimal place" even more famous to a still wider audience. This great tradition of precision physics flourishes still more actively in our own times thanks not least to the development of the atomic clock, radar, the Mossbauer effect and the laser. Hopes are high that within a few years we shall have tests, with greatly improved accuracy, of the three famous predictions of general relativity the precision of the orbit of Mercury, the bending of light by the Sun and the red shift of light from the Sun, at present none of these effects is reliably established with a precision better than 10%. Ideas for these and other precision tests of Einstein's theory today receive more attention from more skilled experimenters than ever before.

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2- FRAME WORK

Black hole formed in the gravitational collapse of stars with big dense cores are dotted

here and there about this and other galaxies, if present expectations are correct. A star in the final stages of collapse to a neutron star or a black hole is a powerful source of gravitational radiation:

waves in the geometry of space. Gravitational radiation also emerges with great strength from two compact masses in close gravitational interaction, whether the two objects are neutron stars or black holes or one of each.

Space itself, until Bernhard Riemann's Gottingen inaugural lecture of 10th June 1854, could be viewed as an ideal Euclidean perfection standing unmoved high above the battle of matter and energy. Einstein translated Riemann's vision of dynamics geometry into clear-cut mathematical terms. In the conception of Riemann and Einstein space tells matter how to move. But matter in turn tells space how to curve. In a revolution, chained up space broke loose and ceased to be the passive arena for physics. It became an active participant. The agent of this revolution, the Einstein who endowed geometry with life of its own, also established rules for the governance of this new dynamics entity. Super space is the rigid and perfect arena for physics [Ref. 2]. It became an active participant. The agent of this revolution, the Einstein who endowed geometry with life of its own, also established rules for the governance of this new dynamic entity. Super space id the rigid and perfect arena, infinite in number of dimensions, in which the geometry of the universe executes its dynamic charges: expansion, vibration, undulation attainment of maximum dimensions, recon traction and collapse.

3- LOCALISED CONCEPT OF GRAVITAION

Matter gets its moving orders from space-time, and space-time is curved by matter, these are the two central principles of classical general relativity. Observe the pea "dropped" at lunch time in the ship. It stays in the centre of the craft. Seen by X-ray vision from outside, it is travelling around the Earth in the same Kepler orbit as the ship itself. How is this miracle possible? Shut away inside the vehicle, it can see neither Earth, Sun nor any star. From what source then does it derive its moment? From the geometry of space time right where it is, says Einstein, from far away, says Newton. Newtonian theory says the satellite move relative to an ideal God-given never changing Euclidean reference frame that pervades all space and endures for all time. That theory goes on to say that the satellite and the pea would have moved along an ideal straight line in this global frame had not "forces of gravity" deflected them. It adds the postulate that the "force gravitational" acting on each object or, more directly, the "gravitational mass" of each object is proportional to the inertial mass of that object. By this combination of postulates it ensures that both objects have the same mass acceleration relative to the ideal straight line. But nothing explains why gravitational mass should be equal to inertial mass. And nothing, not even light, ever moves along the ideal straight line - it is a purely theoretical line.

Einstein's theory says there is no ideal Euclidean reference that extends all over space,

despite anything to the contrary that Euclid wrote 2270 years ago and why say there is when there is nothing that directly evidences that hypothesis? To try to describe motion relative to far away objects in the wrong way to do physics! Physics is simple only when analyzed locally. And locally the world line that a satellite follows is already as straight as any world line can be. The pea feels no "force of gravitation". The traveler feels no "force of gravitation". So let us forget about "force of gravitation". Recognize that every one of these objects has simple moving orders: "Follows a straight line in the local inertial reference frame" . Each has only to sense the local structure of space-time, right where it is, in order to follow the correct track. No more talk of "inertial mass" and "gravitation mass", and no more talk of gravitation, so long as one follows the motion of a single test object.

4- THE REGION OF STRONG GRAVITATIONAL FIELD

In the words of Euclid, the nature or geometry of space is flat irrespective of whether you stand in empty space or close to a celestial object. According to Einstein's theory of relativity, space and time are intimately related and the nature of space-time is changed in the presence of a gravitational field. It is curved in the same way as a rubber sheet gets curved when a ball is place on it. In the free space, a light ray travels in a straight line. In a gravitational field, although it still tends to move in a path as straight as possible, because space-time is curved, it gets bent from its original direction of emission (the phenomenon of gravitational bending of light). The extent of bending depends on how large the space-time curvature is. This prediction of Einstein's general relativity was for the first time verified during the total solar eclipse of 1919.

In the gravitational field of a mass, clocks slow down. Once again, the extent of slowing down depends on how large the curvature of space-time is. Thus, according to distance observer, clocks placed in the vicinity of a mass at different distances with respect to its centre appear to run at different speeds.

Since any vibrating system can be used as a clock, a vibrating atom which is emitting radiation also acts as one. The frequency of its radiation can be taken as the unit time interval of the atomic clock. At the surface of a star, there are innumerable multitudes of such clocks. The radiation emitted by atoms at the surface of stars (the region of strong gravitational field) when compared to the radiation emitted by similar atoms in our laboratory (the region of week gravitational field) turns out to have a small frequency. This is because the period between two 'beeps' of the atom in a strong gravitational field appears to be longer. This time dilation leads to the phenomenon of "gravitational red shift" . It depends on the mass-to-radius ratio (i.e. Mass/Radius) of the object. The larger the ratio, the stronger is the red shift effect. The effect has been measured in the case of "white dwarf" stars like "sirens B" (the faint companion of the star sirens in the constellation of coins a Major.

How much does matter curve space-time? Newtonian theory gives a quick route to the answer. Put a test particle in a close-in orbit around a planet of radius a and of uniform density.

$$\rho(cm^{-2}) = (G/c^2)\rho_{conv.}(g/cm^3)$$
$$= (0.742\times10^{-28}\ cm/g)\rho_{conv.}$$

Equate the kinematic acceleration of the test particle, going round with Angular velocity $\omega(cm^{-1}) = \omega(\text{radian/cm of light travel time}) = (1/c)\,\omega_{conv.}\ (sec^{-1})$, to Newton's inverse square law acceleration of gravity, thus

$$\omega^2.a = (4\pi a^3\rho/3)a^2,$$

Which further gives

$$\omega^2 = 4\pi\rho/3,$$

a circular frequency independent of the radius of the planet - whether its radius be 10,000 km or 10m! Bore holes through the centre of the planet along the X-axis and along the Z-axis. Test masses dropped in these holes execute simple harmonic motion with circular frequency. The circular motion oft he orbiting test particle can even be regarded as the superposition, with 90-degree phase difference, of two such vibrations along the X- and Z-axes. Once one notes the simple harmonic character of the motion of one test particle, one also recognizes the simple harmonic character of the relative motion of two nearly particles oscillating along the X-axis.

Their separation η satisfies the equation

$$D^2\eta^1/Dr^2 + \omega^2\eta^1 = 0$$

Comparing with the equation of geodesic deviation, one finds the (x, x) components of the tide-producing acceleration:

$$R^1{}_{010} = \omega^2 = 4\pi\rho/3,$$

Identical values obtain for $R^2{}_{020}$ and $R^3{}_{030}$ through out the interior of the planet. In this simple case of a planet of uniform density and spherical symmetry one has only to observe the full repetition time T between crossing of the world lines of two test particles [T(cm) = $CT_{conv.}$] in order to have at once ($T\rightarrow\omega\rightarrow\rho$) a value of the density.

5- THE TENSOR MEASURING THE DENSITY

In the case of attraction object of no special symmetry and of non-form density, ordinarily no single one of the indicated components of the tide-producing acceleration has the value $4\pi\rho/3$. Only a certain combination of the components of the curvature tensor is fixed by the density. Compare Newtonian theory, where determines neither

$\partial/\partial x^2$) x (gravitational potential)

$= \partial^2\varphi/\partial x^2$ nor $\partial^2\varphi/\partial y^2$ individually,

but only the combination

$$= \partial^2\varphi/\partial x^2 + \partial^2\varphi/\partial y^2 + \partial^2\varphi/\partial z^2 = 4\pi\rho$$

The principle of correspondence with Newtonian theory, plus other compelling considerations of the principle gave Einstein a unique equation. It ties the density to none of the cited components of the curvature tensor directly.

Rather, it gives as basic formula, the following:

$$R^{1\ 2}{}_{1\ 2} + R^{2\ 3}{}_{2\ 3} + R^{3\ 1}{}_{3\ 1} = 8\pi\rho$$

Here the caret superscripts indicate use of a local Lorentz reference system ($-g_{00} = g_{11} = g_{22} = g_{33} = 1,\ g_{mn} = 0$ for $m \neq n$ rather than a completely general co-ordinate system. In a general co-ordinate system Einstein's equation reads

$$R\alpha\beta - 1/2(g\alpha\beta R) = 8\pi T\alpha\beta$$

Where $T_{\alpha\beta}$ is the tensor measuring the density of mass-energy, momentum and stress. When space-time is static or even if not static when space-time admits a moment of time symmetry (as for example a model universe at the phase of maximum expansion) then the key equation takes the simple form

$$(3)_R = 16\pi\rho$$

Here (3)R is the scalar curvature invariant of the 3-dimensional space-like hyper-surface that slices through space-time at the moment of time symmetry. When, in addition, this 3-geometry possesses spherical symmetry, one can write the element of distance in the form

$$ds^2 = \frac{dr^2}{1-\frac{2m(r)}{R}} + r^2(d\theta^2 + \sin^2\theta\, d\varphi^2)$$

Then the equation relating curvature and density form easy to remember,

$$dm(r)/dr = 4\pi r^2\rho(r)$$

so much for recalling what Einstein's geometry dynamics has to say about the effect of curvature on matter and the effect of matter on curvature.

6- AN APPROXIMATION

Thus Einstein's equation - the equation of general relativity - describe the behavior of space time in the presence of mass-energy. The universe we live in is a region of space-time containing mass-energy, and it is no surprise to learn that Einstein's equations can be used to describe the behavior of the universe. Strictly speaking, though, Einstein' equations can only be used to describe the behavior of a complete universe. When we use them to describe the behavior of light passing near the sun or the orbit of Mercury, we actually using an approximation, because general relativity is a complete theory dealing with complete region of space-time, which means the whole universe. The equations can happily be applied to black holes, which are universe miniature regions of space time bent round and cut off from the most flat space time that stretches across the visible universe, and they can equally happily be applied to the puzzle of how our universe came into existence, and how it evolved into state we see today.

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