Essay 99: Application of X Theory to Orbital Phenomena

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The x theory of precessing orbits is based directly on experimental data by definition, and so is the experimentally correct theory of such orbits. Having established this fact of nature the theory can be applied to other famous phenomena such as light deflection by gravitation without any further assumptions. In planetary precession the orbit is a precessing ellipse, and in light deflection it is a precessing hyperbola. In an ellipse the eccentricity of the orbit is less than unity and greater than zero, and in the hyperbola it is greater than unity. In UFT263 on www.aias.us the theory gave the observed result for light deflection by gravitation to experimental precision using the same orbital equation for x theory as used in planetary precession. The x theory gives the experimental result in both cases to experimental precision. In several UFT papers and essays it has been shown in comprehensive detail that the Einstein theory contains numerous flaws and does not give planetary precession or light deflection correctly. Gravitational time delay is a minor variation on light deflection by gravitation and is automatically given by x theory to experimental precision.

In addition the x theory does not use the assumptions used by Einstein, identically zero mass and a null geodesic. The x theory uses the opposite inference to Einstein: that the photon mass is identically non zero. This latter inference was given by Poincare in July 1905 and results in a completely different physics, notably ECE theory and x theory. The assumption of non zero photon mass was taken up by de Broglie as part of his development of wave particle duality. The calculation of the photon mass can be carried out in x theory using an infinitesimal line element and metric which is a variation on the Minkowski metric. In this variation the mathematical structure of the Minkowski metric is retained but the velocity in the observer frame is defined by the orbit. It is the orbital linear velocity of the photon. In the obsolete Einstein theory the photon always travels at c in the vacuum. In the Poincare / de Broglie theory of photon mass the photon behaves as a relativistic particle with mass. It travels at a velocity v that is less than c. The relativistic momentum of the photon in orbit can be calculated from p = gamma m v, where m is the photon mass and gamma the Lorentz factor. The latter is also defined in terms of the non constant v.

Therefore x theory provides a very simple and clear way of developing special into general relativity by adding the rotational component of v to the radial component. The usual textbook picture of special relativity is that it is theory in which one frame moves at a constant v with respect to another. This is the basic assumption used originally by Lorentz in the late nineteenth century. Contemporary group theory recognizes however that the Lorentz group contains rotation as well as boost generators, and that the Poincare group contains in addition the generators of spacetime translation. The Lorentz transform applies also to rotation, as described for example by Carroll in “Spacetime and Geometry: an Introduction to General Relativity” or Ryder, “Quantum Field Theory”. As soon as rotation is introduced, acceleration is introduced, because the inward directed centripetal acceleration is that needed to keep an object in circular orbit. So special relativity was never restricted just to linear motion without acceleration. In a circular orbit the second derivative of r with respect to t is always zero, it is the sum of a negative valued centripetal acceleration and an equal and opposite, positive valued, centrifugal acceleration. This can be shown from considerations of the equivalence principle and conservation of total angular momentum. The circular orbit is r equal to the half right latitude alpha and every point on a circular orbit is a turning point.

Having calculated the relativistic momentum of the photon its mass can be calculated from the de Broglie Einstein equation that equates the relativistic energy to the Planck photon, the quantum of energy. So x theory produces a value for the photon mass in this way.

The gravitational red shift is implicit in the equivalence principle on the classical level, and is calculated in x theory from the Lorentz factor expressed as dt / dtau, where tau is the proper time, the time in the frame moving with the particle. For example the time recorded in an aircraft is the proper time, tau, and differs slightly from the time t recorded in a stationary laboratory. The gravitational red shift is not a manifestation of Einstein's general relativity, although he did infer it in the context of special relativity.

In conclusion, all the precise experimental results formerly attributed to Einsteinian general relativity can be attributed to the geometrically correct and much simpler x theory.