

Essay 101 : Three Dimensional Orbits

Written by Myron Evans, broadcast by Robert Cheshire

More than four hundred years ago Johannes Kepler analysed the orbit of Mars using data by Tycho Brahe and it seemed to him that it was an ellipse in which Mars returned to a point such as the perihelion every orbit. He deduced three laws of planetary motion which were used notably by Hooke, Newton and Leibniz to deduce that the law of attraction between Mars and the Sun is the famous inverse square law of universal gravitation. More precise astronomy later revealed that the perihelion of the planet advances every orbit. Most of this precession of the perihelion could be explained by the inverse square attraction of other planets, but a small part of it could not be explained in this way. This part of the precession was attributed to the Einstein general relativity, now known to be based on a fundamentally incorrect geometry and therefore meaningless as a theory of physics. In Einstein Cartan Evans unified field theory the precession has been explained by rotating the Minkowski metric of special relativity to generate a Thomas precession (UFT265).

In recent work however a major advance in planetary theory has been made by replacing the plane polar by spherical polar coordinates in the kinetic energy of the orbiting mass m , for example the planet Mars observed by Kepler. The four hundred year old planetary theory was based on the plane polar coordinates because it was assumed that the solar system orbits of planets are planar. It is always dangerous in physics to assume something without proving it as rigorously as possible. The four hundred year old groupthink proceeded by assuming that there is only one component of angular momentum in planetary theory, the Z component, where Z is perpendicular to the XY plane of the orbit - or the ASSUMED XY plane. So the plane polar coordinates were used because these are adequate for planar orbits. So the old groupthink assumed that an orbit is planar, and deduced that it is planar, the archetypical circular logic.

An orbit takes place in classical physics in three space dimensions, described by the spherical polar coordinates. When these are used in the theory of orbits it becomes a far richer theory producing many new and completely unexpected results on the classical level, without even mentioning relativity. The vivid graphics by my co author Horst Eckardt in recent UFT papers on www.aias.us, and on its blog or diary demonstrate the full glory of the three dimensional theory. These graphics have already been syndicated around the world. The kinetic energy is changed from 2D to 3D, but the potential energy remains the same. So all the new effects are due to the change in kinetic energy. In the 3D theory there are three components of angular momentum, the X, Y, and Z components, and the total angular momentum magnitude L . A lagrangian analysis of the 3D theory shows which of these angular momenta are conserved and produces relations between the angles of the spherical polar coordinate system.

One of the most elegant results to date of the 3D theory is that it explains the precession of the perihelion with classical dynamics. The precession to an excellent approximation is the ratio of L to $L_{\text{sub } Z}$, the ratio of the magnitude of the total angular momentum to its Z component. This result is a wholly new universal law of precessions, and true for all observed precessions. It is known by very precise contemporary astronomy that all observed precessions of the perihelion are very tiny advances in angle. In the solar system the precession of the perihelion is only a few arc seconds per orbit. So the ratio of L to $L_{\text{sub } Z}$ is only slightly greater than one. In 3D orbit theory therefore the three dimensional nature of the analysis manifests itself in a supremely elegant way - it explains the perihelion precession without recourse to relativity. What is more, all can agree on this result because it is based on the spherical polar coordinates of any good textbook or website. The result shows that the

inverse square law of attraction, probably the most famous law in physics, produces a precession of the perihelion provided that the kinetic energy is worked out with spherical polar coordinates. In the old two dimensional theory the same inverse square law results in a closed orbit and no precession.

That was the result of assuming that the orbit was planar. That assumption delayed the development of orbit theory for four hundred years, and led into the alley of a thousand obsolete dustbins - Einsteinian general relativity. Surely we can all agree that the latter was a very great theory in its own time, but not any more.