

## Essay 102: Three Dimensional Orbits in Galaxies

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Contemporary astronomy observes a myriad of galactic structures in which stars orbit a very heavy central mass  $M$ . It is accepted that the Einstein general relativity is wildly wrong, so it is quite obvious to any layman that there are no black holes. It is not yet obvious to dogmatist with omelettes on their countenances. The central mass cannot be a black hole because the black hole is an erroneous claim made by dogmatists who adhere to an erroneous geometry - the second Bianchi identity upon which Einstein based his field equation directly (UFT88, now a classic paper). It is also quite obvious to any layman that these orbits are three dimensional, but not to the dogmatists who see no ships. The only thing they see is an event horizon, another regrettable howler that any wolf would have been proud of.

Therefore the general explanation of three dimensional galactic orbits requires the spherical polar coordinates in the kinetic energy of the hamiltonian and lagrangian in classical dynamics. Once this self evident adjustment is made to four hundred year old groupthink, the resulting three dimensional orbits can be graphed and classified in various ways, introducing the required myriad of three dimensional possibilities instead of sticking to the boring old two dimensional plane (or what was thought to be a plane). The classifications of the orbits are given in UFT269 ff. on [www.aias.us](http://www.aias.us) in terms of spherical polar plots and Cartesian solid geometry.

The whirlpool galaxy is the most spectacular and images of it have been syndicated worldwide for years. This object appears to be roughly planar, but that again is a mirage. Its correct description needs three dimensions. Obviously in retrospect as usual, a whirlpool galaxy is situated manifestly in the three dimensions of space within the context again of classical physics. Space is three dimensional and not two dimensional. We can now explain a great deal we could not before, with classical physics, and need only use special relativity when required. For example Thomas precession theory (UFT265 and UFT276). Einsteinian general relativity is no longer needed at all. It is a good idea not to use a theory in which half the geometry is missing. Einstein's omission of torsion leads to the inconvenient fact that it fails completely to describe whirlpool galaxies. This is another omelette on the countenance of those who refuse to countenance change. In other words the Einstein theory fails qualitatively in whirlpool galaxies, whereas the ECE theory offers a simple explanation of them according to Baconian principles and Ockham's Razor.

The new three dimensional orbit theory offers a lot more information about the whirlpool galaxy. This has been demonstrated in recent papers by using an inverse cube law of attraction between an orbiting star of mass  $m$  and the central mass  $M$  of the galaxy. One could argue that this is simplistic, galaxies are much more complicated than that, but Ockham's Razor is simple minded, and we need to begin again at the beginning, like "Under Milk Wood". The inverse cube law of attraction leads to the hyperbolic spiral orbit that is spectacularly evident in the Hubble space telescope. In three dimensional orbit theory the spiral's orientation depends on the ratio of  $L$  to  $L_{sub Z}$ , the new universal law of planetary precession. There is much more to a three dimensional spiral than meets the eye. To generate the 3D whirlpool galaxy from the 2D whirlpool galaxy the inverse cube law of attraction remains the same, so the potential energy remains the same, but the kinetic energy is described by spherical instead of plane polar coordinates. Very obvious - and very much in retrospect. Looking forward it was not obvious for four hundred years.

There are many different shapes of three dimensional galaxy, for example nearly spherical to cigar shaped (extended ellipsoidal) and so on. So it becomes obvious and again in retrospect to apply 3D orbital theory to 3D orbits of stars around a central mass  $M$  in a

galaxy. One recent paper of UFT269 ff. gives a sample of sixteen classifications of three dimensional orbits using Cartesian coordinates of solid geometry. These represent the three dimensional conic sections of three dimensional orbit theory.

A new world of orbits becomes vividly apparent and the four hundred year old flatlander has had his day. To those with omelette all over them, the world is still flat.