GALACTIC ROTATION ANOMALY

According to 'MATTER (Re-examined)'

Nainan K. Varghese, matterdoc@gmail.com
http://www.matterdoc.info

Abstract: Orbital speeds of stars, far from centre of a galaxy, are found roughly constant, instead of reductions predicted by current gravitational theories (applied on galactic and cosmological scales). This is called the anomalous rotation of galaxies. This article intends to show that constant angular speeds of all macro bodies in a galaxy are natural phenomenon and there is no mystery about it.

Keywords: Galaxy, Stable galaxy, rotational anomaly.

A planetary system is a group of macro bodies, moving at certain linear speed in circular path around galactic centre. Central body of planetary system is by far the largest and controls mean linear speeds of all other members. Gravitational attractions between macro bodies of planetary system cause perturbations in their directions of motion, resulting in additional curvatures of their paths. When perturbed paths of smaller macro bodies are related to central body in assumed static state, we get apparent orbital paths of planetary bodies. They appear to revolve around static central body in elliptical/circular paths. Apparent orbital paths are unreal constructs about imaginary static state of central body. They are convenient to find relative positions of macro bodies in the system and to predict cyclic phenomena occurring annually. In reality, planetary bodies do not orbit around central body but they move in wavy paths about the central body. Central and planetary bodies move at a mean linear speed along their curved path around galactic centre.

Perturbations of orbital paths of macro bodies in planetary system are related directly to their matter-content and inverse square of distance from central body. Distance from central body has greater effect of magnitudes of perturbations. Hence, normally, paths of planetary bodies at greater distance from central body are perturbed by lesser magnitudes. Curvatures and thus angular speeds of their apparent orbits reduce as distance from central body increases. Since planetary system has no real spin motion, this is an imaginary phenomenon. However, many learned cosmologists seem to take spin motion of planetary system as real phenomenon and consider that members of all spinning group pf macro bodies should behave in similar manner, i.e. angular (spin) speed of members should reduce as their distance from centre of system increases.

Stable galaxy consists of many macro bodies revolving around its centre. This group can be considered as a spinning fluid macro body, rotating at a constant angular speed. Gravitational collapse initiates spin motion of galactic cloud and maintains constant spin speed of outer parts of stable galaxy. Centre part of galaxy, which is usually hidden, may or may not be spinning. We can observe only visible stars and their angular speeds about galactic centre. Linear motions of macro bodies, caused by gravitational attractions towards other macro bodies in the system, have two components each. One component, due to additional linear work invested in association with it, produces macro body's linear motion, in a direction slightly deflected away from centre of circular path. Other component, towards centre of its circular path, is caused by additional angular work invested in association with it. This component produces angular motion of macro body.

All matter-particles in a fluid macro body, spinning at constant speed, have constant angular speeds. Consider a matter-particle at O, in figure 1, moving in circular path AOB. XX is tangent to circular path at O. Instantaneous linear speed of matter-particle is represented by arrow OC, in magnitude and direction. It has two components; OD, along tangent XX and DC, perpendicular to tangent XX and away from centre of circular path. This component, DC, represents centrifugal action on matter-particle due to its motion in circular path. In order to maintain constant curvature of path, matter-particle has to have instantaneous linear (centripetal) motion equal to CE toward centre of circular path. If magnitudes and directions of instantaneous motions are as shown in figure 1, matter-particle maintains its motion along circular path AOB at constant angular speed.

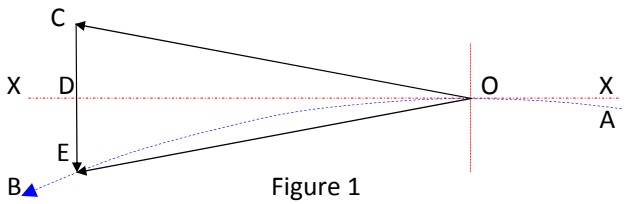

Figure 1

Should the matter-particle increase its instantaneous linear speed for any reason, both components OD and DC would increase. Component OD tends to move matter-particle at greater linear speed along tangent XX. Outward component DC tends to move matter-particle away from centre of its circular path. The matter particle tends to increase radius of curvature of its path. This action is usually assigned to imaginary 'centrifugal force'. In reality expansion of radius of curvature of path is caused by centrifugal component of linear motion. Reduction in centripetal action also produces similar results.

Should the matter-particle decrease its instantaneous linear speed for any reason, both components OD and DC would reduce. Component OD tends to move matter-particle at lesser linear speed along tangent XX. Reduction in outward component DC tends to move matter-particle towards centre of its circular path. The matter particle tends to reduce radius of curvature of its path. Reduction of radius of curvature of path is caused by reduction in centrifugal component of linear motion. Increase in centripetal action also produces similar results.

In other words, matter-particle regulates its distance from centre of its circular path so that its angular speed remains constant. This is the reason for action of centrifuges. As linear speeds of matter-particles increase, they move outwards, in an effort to maintain their angular speed constant.

Additional work, done for linear motion of a matter-particle and additional work, done for its angular motion are entirely separate and distinct. Additional work for linear motion of a matter-particle can produce only linear motion and additional work for angular motion can produce only angular motion. In the case, explained above, increased in linear speed of matter-particle is considered. That is, additional work invested in association with matter-particle is of linear nature. It can only increase its linear motion. As no additional work for angular motion is invested matter-particle cannot change its angular speed. Instead, matter-particle is compelled to move away from centre of its rotation, so that it can increase magnitude of linear motion while keeping magnitude of angular motion constant.

Similarly, increase in centripetal effort invests additional work required for angular motion of matter-particle. Matter-particle tends to increase magnitude of its angular motion. Curvature of its path

increases by reducing its distance from centre of circular path. Matter-particle tends to move towards centre of circular path, so that it can increase its angular speed while keeping its linear speed constant.

Every macro body in a stable galaxy behaves in a manner similar to matter-particle, represented in figure 1. They tend to position themselves in the system, so that their linear and angular speeds match corresponding works associated with them. Macro bodies strive to maintain their angular speeds constant by keeping appropriate distance from centre of rotation. Macro bodies towards the central region may experience additional centripetal effort. They might increase their angular motion and move towards central point to merge with black hole present there. In due course of time, macro bodies on outer fringes move away from galaxy and destroy its stability.

In a galaxy, various macro bodies arrive at their relative position gradually by error and trial, during which their relative positions and linear and angular speeds are stabilized. Galaxy, as a whole, stabilizes only when constituent macro bodies have reached their steady relative positions and motions. In order to maintain stability, it is essential to maintain relative positions of all constituent macro bodies by having constant and equal angular speeds and linear speeds corresponding to their distances from galactic centre. Change in relative position or linear or angular speed of even one macro body is liable to destabilize the galaxy.

As and when superior 3D matter-particles at the fringe of galaxies attain linear speeds approaching speed of light, they break-down into primary 3D matter-particles and produce halo around equatorial region. Halos of neighbouring stable galaxies interact to prevent their translational movements and maintain steady state of universe.

Therefore constant angular speeds of constituent macro bodies of stable galaxies are their natural states. There are no mysteries or anomalies about them. This phenomenon is mystified by those who consider imaginary spin motions of planetary systems are real. Therefore, assumptions of dark matter, time dilation, modification of gravitational laws, etc and complicated mathematical exercises are irrational and unnecessary to prove non-existing rotation anomaly of galaxies.

Conclusion:

Galactic rotation anomaly is a non-existing phenomenon derived from imaginary spin motions of planetary systems about their central bodies in assumed static states. Constant angular speeds of stars in a galaxy confirm static state of galactic center (in space), rather than produce an anomaly.

Reference:

[1] Nainan K. Varghese, *MATTER (Re-examined)*, http://www.matterdoc.info

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