Some Propositions regarding the Nature of Dark Energy and Dark Matter

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Abstract- *This Paper utilizes Propositions about the nature of dark energy and dark energy and dark matter to trace the origin of the in ationary universe.We are also co-relate the classical proposition about tyhe nature of dark energy and dark matter,both of which can be related to the accelarting expansion of the universe.*

Keywords- Cosmology, Cosmological constant,Dark energy,Dark Mat-ter,In ation..

I. INTRODUCTION

Cosmology is the branch of science concerned with the study of the entire In the early 1990s, one thing was fairly certain about the expansion of the universe. It might have enough energy density to stop its expansion and recollapse, it might have so little energy density that it would never stop expanding, but gravity was certain to slow the expansion as time went on. Granted, the slowing had not been observed, but, theoretically, the universe had to slow. The universe is full of matter and the attractive force of gravity pulls all matter together. Then came 1998 and the Hubble Space Telescope (HST) observations of very distant supernovae that showed that, a long time ago, the universe was actually expanding more slowly than it is today. So the expansion of the universe has not been slowing due to gravity, as everyone thought, it has been accelerating. No one expected this, no one knew how to explain it. But something was causing it.Eventually theorists came up with three sorts of explanations. Maybe it was a result of a long-discarded version of Einstein's theory of gravity, one that contained what was called a "cosmological constant." Maybe there was some strange kind of energy- uid that lled space. Maybe there is something wrong with Einstein's theory of gravity and a new theory could include some kind of eld that creates this cosmic acceleration. Theorists still don't know what the correct explanation is, but they have given the solution a name. It is called dark energy.More is unknown than is known. We know how much dark energy there is because we know how it a ects the universe's expansion. Other than that, it is a complete mystery. But it is an important mystery. It turns out that roughly 68Another explanation for dark energy is that it is a new kind of dynamical energy uid or eld, something that lls all of space but something whose e ect on the expansion of the universe is the opposite of that of matter and normal energy. Some theorists have named this "quintessence," after the fth element of the Greek philosophers. But, if quintessence is the answer, we still don't know what it is like, what it interacts with, or why it exists. So the mystery continues. A last possibility is that Einstein's theory of gravity is not correct. That would not only a ect the expansion of the universe, but it would also a ect the way that normal matter in galaxies and clusters of galaxies behaved. This fact would provide a way to decide if the solution to the dark energy problem is a new gravity theory or not: we could observe how galaxies come together in clusters. But if it does turn out that a new theory of gravity is needed, what kind of theory would it be? How could it correctly describe the motion of the bodies in the Solar System, as Einstein's theory is known to do, and still give us the di erent prediction for the universe that we need? There are candidate theories, but

II. REVIEW OF LITERATURE

The rst detection of dark matter is attributed to Zwicky (1933), who mea-sured the velocity dispersion of galaxies in the Coma cluster and found their velocities to far exceed that which could be attributed to the luminous matter in the galaxies themselves. The work of Zwicky on Coma was followed up by Smith (1936) for the Virgo cluster of galaxies. Once again, the velocities of its constituent galaxies indicated an unexpectedly high mass-to-light ratio.

Babcock (1939) used optical spectroscopy to measure the rotation of the An-dromeda galaxy (M31), the nearest of the large galaxies in the vicinity of the Milky Way, and found the rotational velocity at large distances from the cen-tre to be too large to be easily attributed to the luminous components. From the velocities of the Milky Way and M31 towards each other, Kahn Woltjer (1959) estimated the mass of the Local Group of galaxies (in which the Milky Way and M31 are the dominating members). By comparing this estimate to that expected from the luminous matter in these two objects, they concluded that most of the mass of the Local Group must be dark.In the 1970s, dark matter became a well-recognized concept. The rotational evidence for dark matter in M31 grew stronger (e.g. Rubin Ford 1970;Roberts Whitehurst 1975) and kinematic investigations of other large disk galaxies (Einasto et al. 1974; Ostriker et al.

1974) gave similar results. These observations in-dicated that dark matter was a common feature among galaxobservations indicated that dark matter was a common feature among galaxies, but did not constrain its spatial distribution. Ostriker Peebles (1973) showed that galactic disks by themselves would be unstable and suggested that they may be surrounded by massive, spherical halos. Hence, the important concept of dark halos, today believed to be common to all galaxies, was born The rst conference devoted entirely to the dark matter problem was held in Tallinn, Estonia in January 1975 (for a review, see e.g. Einasto 2004). Already in these early days, a wide range of di erent candidates for the dark matter were considered. The rst suggested were baryonic, i.e. made up of particles consisting of three quarks { like the protons and neutrons which contribute most of the mass to the matter familiar to us from everyday life. Dark-matter candidates in this category were ionized gas (Field 1972), very faint, low-mass stars (Napier Guthrie 1975) and collapsed objects, like stellar black holes (Thorstensen Partridge 1975). Cowsik McClelland (1973) appear to have been the rst to suggest a non-baryonic particle, the neutrino, as a stu-dent of dark matter Once it was recognized that most of the matter in the Universe was dark, thiscomponent was expected to dictate the conditions for the formation of large structures like galaxies and galaxy clusters. The fact that relativistic dark matterparticles (i.e. moving close to the speed of light in the early Universe) {today referred to as hot dark matter (HDM) { like standard, low-mass neutrinos,would have severe trouble in explaining the observed structures soon became evident. The advantages of cold dark matter (CDM), i.e. dark matter consisting of particles with non-relativistic velocities early on, was made clear by Primack (1982), Peebles (1982) and Blumenthal et al. (1984). Until this day, CDM holds the position as the leading dark-matter model, although a number of recent problems (see Sect. 1.6) with CDM may call for a revision of this scenario. The rst strong indi-cations of dark matter in dwarf galaxies came in the early 1980s. Faber Lin (1983) studied dwarf spheroidals and found them to contain large amounts of dark matter. Subsequent studies (for a review, see e.g. Mateo 1998) have in fact shown that dwarf galaxies have higher mass to-light ratios than normal galaxies. Smaller stellar populations, like globular clusters, do on the other hand not appear to su er from any signicant missing matter problem.The road to establishing the presence, amount and distribution of dark matter r in our own galaxy, the Milky Way, proved to be paved with more difcul-ties than in the case of external systems. In principle, the task is simply to measure the velocities of suitable test particles (e.g. gas clouds or stars) at known dis-tances. Pioneering e orts in this eld were made by Oort (1932, 1960). Due to the problems of determining accurate distances to objects whose velocities are known (or vice versa), and in correcting for the motion of the Sun itself aroundthe centre of the Milky Way, large uncertainties are however introduced. For tracer objects not located in the Milky Way disk, e.g. halo stars, globular clus-ters and satellite galaxies, the assumed shape of their orbits (circular, ellipticalor radial) can also have a pronounced impact on the outcome.

III. IN ATION OF DARK ENERGY AND DARK MATTER

In the earlier papers .It has been proposed that the accelarting expansion of the universe is due to the cosmological constant.In the prosed principls of equivalence ,in an expanding spherical distribution of matter,Spacetime itself acts as the acceklearting frame of reference of the inertial force thus generated is momentarily equivalent at a certian radial distance to the gravitional force experinced by the gravitional mass of the object.This frame is responsible for accelating expansiuon of the universe and this is the only visible matter in the universe.The accerlation of the spacetime is measured by cosmological constant as c2R3

It was driven by false vaccum and it contain virtual particles and more-over it ends with the decay of the false vaccum and hence real particle was produced.It is The particles emerge due to the electroweak symmetry break-ing and all of which consitute the visible matter in the universe. The dark energy is mass objects which are in cosmological freefall beacuse of the cos-mologicalization of the weak principle of equivalence.The principle convey the universality of freefall.The freefall can be observed by compare the gravi-tional mass of an object with inertial mass of stationary object.and later it has ben observed with the respect to an acceleating frame of reference gives the impression that the inertial mass of the object is aslo freefall.Now we have expanding universe whose inertial mass on the surface of an expanding spherical distribution of matter and which is cosmological freefall in space-time accelerating frame of reference and whois parametrized by cosmological constant.It is objects which are not directly detectable .i.e they are proposed be the dark matter in the universe.

The scale factor R(t) expands exponentially .

In In cosmological acceleration the scale factor is almost doubles,the in ati-nary universe is expanding with almost uniform velocity and it depends on time.The inferred mass is of two types (1) Virtual particle of false vaccum and (2) Inertial mass which is piggybacking on the accelerating expansion of universe.

At Present propoaition, Inertial mass object/dark matter is freefall in cos-mological due to weak principle of equivalence.An accerelating expansion is driven by virtual particles whose inertial mass is not classically manifested but inferred due to expansion.But we obsereved that not only the inertial mass objects are themselves locally-inertial frame of reference objects beacuse of local absence of accerlating,their inertial mass would not be indenti able manifested,but they are cosmological freefall.So, we observed the existence of their inertial mass.We know that the objects in gravitional freefall are weightless beacuse both gravition and inertial mass are equivalent and it cancel the inertial force produced by the inertial mass of the object.Inertial mass cancel itself as well.

Therefore,we have no net inertial mass in the object and onluy gravitional mass is present and it is observed through its gravitional e ects.

Thuss dark matter is purely gravitional space time objects when end of in a-tion,the expansion is no longer be exponentially and non uniform velocity.it is possible only when inertial mass emerge as local objects.

Hence,At present proposition the end of in ation, the mass mass of inertial is convert into mass of real particles .i.e visible matter.

IV. CONCLUSION

It has been observed that the presence of dark matter and dark energy in the big bang universe can be traced back to in ationary universe..It has been observed that when in ation ends,inferred inertial mass of a portion of the virtual matter convert into inertial mass of real particles.The proposition re-quires that the inertial of the vissible matter be in spacetime accelerating fame of reference ,which is responsible for the late-time accelerating expan-sion of the universe.It has been observed that mass is free fall in the in ation-ary universe.and when in ation end it converts into the dark matter in the universe. Therefore, it is observed that nothing in the universe that drives the accerlarting exapnsion of the universe.

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