An explanation for quasars and gamma ray bursts

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Abstract: Quasars and gamma ray bursts are explained as powered by matter-antimatter annihilation in a universe composed of equal amounts of matter and antimatter. Observations supporting this view are presented. The common hypothesis that astronomical black holes are responsible for quasars and gamma ray bursts is criticized. © *2011 Physics Essays Publication*. [DOI: 10.4006/1.3627235]

Résumé: Les quasars et les sursauts de rayons gamma sont expliqués par l'annihilation matière-antimatière dans un univers composé à parts égales de matière et d'antimatière. Des observations à l'appui de cette thèse sont présentées. L'hypothèse communément admise des trous noirs astronomiques producteurs de quasars et de sursauts de rayons gamma est critiquée.

Key words: Cosmology; Quasars; Gamma Ray Bursts; Superclusters; Antimatter; Field Equation; Mass-Energy Relation; History of Physics; History of Relativity; Henri Poincaré.

I. INTRODUCTION

The modern theory of gravitation is represented by the gravitational field equation, this equation first discovered by David Hilbert in 1915 by way of construction of a variational principle.[1] The gravitational field equation has undeniable success in describing such phenomena as the deviation of starlight during solar eclipses, or the precession of the perihelion of Mercury. The field equation also impressively correctly yields in proper limits of Newton's theory of gravity, and yields the complete theory relativity, which was first discovered and proven covariant for all of Maxwell's equations by Henri Poincaré in 1905.[2]

The field equation is however not a complete theory. Neither from the field equation, nor from the theory of relativity which it contains, can the exact mass-energy relation ($E = mc^2$) be rigorously derived, although the exact mass-energy relation is an interpretation which is consistent with the theory of relativity. The mass-energy relation can only be theoretically rigorously derived from Maxwell's equations, as was first demonstrated by Poincaré in 1900 for the effective mass of electromagnetic energy.[3] The gravitational field equation here is also not regarded as a satisfactory theory for the reason that the field equation degenerates into unphysical mathematical singularities, such as those singularities on which are based models of astronomical black holes or the hypothetical initial point of the big bang theory. The field equation completely breaks down just inside of the surface of an astronomical black hole, and cannot explain the moment immediately preceding the beginning point of the big bang theory. Furthermore, to date, there exists no satisfactory quantum theory of gravity which could explain black holes as other than a mathematical singularity.

The field equation is commonly incorrectly lauded as a general theory of relativity. The field equation is however *only a theory of gravitation*, and is not *in any sense a general theory of relativity*[4] for there exists nowhere in nature a principle of general relativity; the laws of physics are simply not the same for observers in acceleration where fictitious forces must be introduced. It is the aura of this unfounded notion that the field equation represents a general theory of relativity that has caused cosmologists to put too much faith in their application of the field equation to the universe as a whole.

In spite of these serious shortcomings of the gravitational field equation, cosmologists have continued to assume that the field equation can be used as the structural basis of their big bang theory as well as that of astronomical black holes. Astronomical black holes have in turn been commonly used to explain both quasars and gamma ray bursts. Quasars are commonly theorized to be an accretion disk of matter falling into a black hole at the center of a galaxy. Gamma ray bursts are usually theorized to result from the collapse of a massive star into a black hole, gamma rays then being emitted as a concentrated beam of powerful electromagnetic radiation.

Should one reject the use of a mathematical singularity that is an astronomical black hole to explain quasars and gamma ray bursts? One then needs an alternative explanation for these phenomena. An explanation for quasars and gamma ray bursts as being powered by matter-antimatter annihilation is however not compatible with the big bang theory which requires a universe dominated by normal matter to avoid the difficulty of a symmetric universe of both matter and antimatter annihilating itself. However, a new explanation for the cosmological redshift has been recently published[5] which rejects the big bang theory and thus permits a symmetric universe composed of equal amounts of matter and antimatter. This allows one to consider matter-antimatter annihilation as the responsible mechanism powering both quasars and gamma ray bursts.

II. OBSERVATIONAL EVIDENCE

In the following discussion there will be presented observations which are here viewed as supporting a model of the universe composed of equal amounts of matter and

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antimatter, and where quasars and gamma ray bursts can both be attributed to matter-antimatter annihilation. First, the observed diffuse cosmic gamma ray background radiation is in itself here taken as an indication that the universe contains distant and large quantities of antimatter. It cannot be ruled out that on the scale of superclusters of galaxies there exist regions of normal matter superclusters interspersed with adjacent regions of antimatter superclusters, where matter-antimatter annihilation occurs at the boundaries separating these regions. The alpha magnetic spectrometer experiment has a remote chance to detect helium antimatter nuclei which could possibly survive the traversal of our local supercluster from a distant antimatter supercluster to arrive at our solar system.[6,7]

The existence of superclusters of normal matter either adjacent to, or separated by voids from, superclusters of antimatter is viewed here as a normal consequence of the incompatibility of the two types of matter; that given an ancient cosmological equilibrium, normal matter regions are only naturally stable when separated from regions of antimatter. The separation here is viewed as a natural consequence of the incompatibility of the two types of matter once an equilibrium has been attained.

At the boundaries separating normal matter superclusters from antimatter superclusters one could expect occasional collisions of astronomical objects which would explain the nearly daily observations of gamma ray bursts as matter-antimatter annihilation. The great diversity of all possible types of colliding objects makes understandable the extreme diversity one observes in the characteristics of gamma ray bursts. Observations of gamma ray bursts at cosmological distances typically far beyond that of our local supercluster are an indication that our local supercluster is composed almost entirely of normal matter.

As mentioned above, quasars are usually viewed as being caused by accretion disks surrounding astronomical black holes hypothesized to exist at the centers of galaxies. However, in spite of the fact that over 100 000 quasars have been observed throughout the observable universe, there is a dearth of quasars within our local supercluster, although our supercluster contains thousands of galaxies. This improbability casts doubt on the usual black hole explanation for the existence of quasars. Quasars are more easily explained by matter-antimatter annihilation beyond the region of our local normal matter supercluster. At the distant boundaries between normal matter superclusters and antimatter superclusters, one should expect random mergers of normal matter galaxies with antimatter galaxies. The duration and intensity of quasars suggest that it is the merging of the cores of normal matter galaxies with the cores of antimatter galaxies which is responsible for the maintained annihilation powering the resulting quasars. The time scales required for the galaxy cores to pass through one another determine the duration of the resulting quasars.

The over 100 000 quasars observed by the Sloan digital sky survey exhibit a very wide range of redshifts which indicate that their distances range from just under 1×10^9 light-years to several tens of billions of light-years. The curious dearth of quasars at lesser distances is in need of a reasonable explanation. It is unreasonable that after tens of billions of years quasars as well as gamma ray bursts both ceased to occur only during our recent and present cosmological epoch, that of just the last small fraction of a billion years. The observation that there is a dearth of both quasars and gamma ray bursts within our local supercluster is interpreted here as an indication that our local supercluster is composed of normal matter while significant amounts of antimatter exist only beyond the region of our local supercluster.

In a small number of cases, Hubble photographs[8] have been able to barely discern the host galaxies surrounding quasars, in spite of the difficulty of the brilliance of quasars obscuring their host galaxies. In these Hubble photographs it is noticeable that the quasar, located in the host galaxy's core, does not significantly alter the overall geometry of the host galaxy. The photographs also show that there are two commonly merging galaxies in the vicinity of the quasar, supporting the view that it is the merging of the cores of normal matter and antimatter galaxies which powers quasars. In some of the Hubble photographs it appears that there is only one host galaxy surrounding a quasar, but a second smaller galaxy is presumed here to be obscured by the brilliance of the quasar while merging into the core of the larger galaxy where it is consumed by annihilation which powers the quasar.

III. CONCLUSIONS

The gravitational field equation is an incomplete theory which cannot explain quasars and gamma ray bursts without invoking unphysical mathematical singularities.

A symmetric universe of equal amounts of matter and antimatter can explain the phenomena of quasars and gamma ray bursts as powered by matter-antimatter annihilation, without having to use the mathematical singularities inherent in the gravitational field equation. This view is consistent with Hubble photographs, and with the observation of the diffuse cosmic gamma ray background radiation, and also with the dearth of both quasars and gamma ray bursts within our local supercluster. With this view now it is also easily understood the extreme diversity of gamma ray bursts. A symmetric universe of equal amounts of matter and antimatter is finally aesthetically pleasing, and far simpler than searching for solutions in the mathematical singularities of the gravitational field equation.

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