The thermal radiation as the expansionary force required by the cosmological constant

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Abstract

Black holes when lose energy evaporate and the radiated thermal spectrum results from entropy emission by a black body, without carrying information about the black hole itself. Black holes gravitational force attracts only the electromagnetic radiation, produced by the stars hydrogen fusion, characterized by absorption lines corresponding to a redshift due to a Doppler effect. However, the thermal radiation emanated from a black hole could not be trapped by galactic gravity. But their frequency allows parametric down-conversion (PDC) treatment, as well as could be done for the cosmic background radiation (CMB). The recoil pressures over galaxies increments their inertial mass, increasing impulse and angular momentum, which could be sum-up to that of resting mass, increasing their gravitational field.

Results

The temperature of the radiation emitted by black holes is inversely proportional to their mass.

Thus, micro black holes are emitters of larger quantities of radiation capable of lacking response to gravitational attraction. There is an annihilation of the curvature generated by gravitational action in starlight.

Thus, the actuation of the black holes decreases curvature and results in entropy or thermal radiation, not attracted by gravity. Thus, the curvature loss by matter and the starlight results in the emission of heat (entropy) to the outside of the black hole.

The thermal radiation (produced by the thermal motion of particles in matter) distends the *voids* space, and could not be capture by the gravitational fields of galaxies. Thus, the inwardly open system has the possibility to accumulate in *voids* the thermal radiation and pressure over the galactic contours, which prevents galactic disaggregation.

The orbital potential jump within atoms generates starlight as enthalpy work and therefore differentiates from the thermal radiation emitted by entropy or disorder increment.

Progress of expansion produces a relationship of galactic recess, operating as impulse and *voids* receiving the entropy of recoil. Expansion of *voids* produces cooling, in which any decrease by half the internal temperature produces an increase a 16 times in volume by parametric down-conversion (PDC). Thus the distending by photon increase and wavelength elongation increases pressure over the galactic contour. Pressure in relationship to vacuum is a local event produced in the laboratory by the cooling of an operational heat pump, allowing to reach temperature proximal to the zero Kelvin. Hence, it is an outside energy to the system itself and the conventional treatment results in a negative pressure. The universe structure and function could be characterized as an inwardly opens system in which the momentum-expansion into the *voids* is self-antagonistic to gravity.

The Sloan Digital Sky Survey (SDSS) [1] and its Baryon Oscillation Spectroscopic Survey (eBOSS) [2] show the primordial acoustic oscillations and its elongation imprinted in the universe, as a space-time function of the universe expansion.

The Planck or theoretical maximal aggregation of energy, within the Planck volume, characterized as bosons. Hence, there is not a restriction over their number, to occupy the same quantum state. Consequently, is not dependent of an inflationary period to transfer from a dimensionless point the theoretical information between all points as it is required for simultaneous concerted changes

on their quantum state. Hence, avoiding the limit of having to changes the velocity of light to reach the connectivity required to allow the emergence into a dimensional space-time.

The introduction of Einstein's cosmological constant implicates that the energy could be configured either as attractive or lacking response to gravitational configuration. Resting mass density indentures space shaping its curvature, but also has interaction with the inertial rotational force with a differentiable axis. The resultant modulates causal or time dependent geometrical configuration of an indeterminism curvature response, between position and angular momentum, corresponding to uncertainty between velocity and position.

A disturbing of causality allows to Penrose calculates multiplications of the possible quantum states of the primordial cosmic entropy to present as 10^{150}.

Defining a decrease of casualty also appears in Feynman's requirement of the sum of the multiple pathways associated to the event.

Gravitational entropy $S_{grav}=10^{121}$ [3]. This disorder increment results by the summa of photons and baryons for the period $\Delta S_{\gamma+B[n\gamma=nB/prs]}=10^{88}k$, where k is the Boltzmann's constant.

Thus, in the matter self-generated space-time gravity creates an indentation, attractive force that in the black holes produces entropy, an opposite sense to enthalpy dispersive force, developing momentum.

The uncoupling of rotational inertial mass axis from that of the gravitational center allows black holes to disrupt the curvature of absorbed photons and baryons, emitting the entropy of the process as thermal radiation.

Symmetry is conserved by an equal amount of positive vs negative pressure, but entropy could also be characterized by its much lower density than baryonic matter, allowing it to occupy a much larger space. The intergalactic space will contain the entropy as *voids* distancing from matter by an inertial momentum that is contained by the opposite pressure on the constitutive attractive force of gravitational galactic matter, preserving the galactic contour. Hence, the conceptual implications of the cosmological constant are not transgressed.

The flatness or cosmological fine-tuning of the Big Bang relates of the initial conditions of the universe in which small deviations produce extreme geometrical conformations on the astronomical appearance determined by SDSS as equal to $\Omega_0(t)=1\pm0.02$.

The relative universe density (Ω) is less than equal to or greater than 1.

Spherical: $\Omega>1$, with greater critical density;

Hyperbolic: $\Omega<1$, under dense;

Flat universe: $\Omega=1$, exactly critical density.

This integration of the dissipative state of the initial Planck bosons, generating hadrons, would generate a universe of spherical curvature (k=1).

A second model of a hyperbolic curvature allows galaxies a recess without time limits (k= –1).

The flatness curvature (k=0) is anti-gravitation forces in opposition to gravity, which hereby is described as kinetic in the *voids*.

Presently, the critical density: approximately five atoms (of monatomic hydrogen) per cubic meter. The average density of ordinary matter is 0.2–0.25 atoms per cubic meter. Hence, expansion leads to a decrease density from the atoms created from 8×10^{60} of the initial amount of Planck bosons.

The key parameter which allows one to calculate the effects of Big-Bang nucleosynthesis (BBN) is the baryon/photon number ratio, which is a small number of order 6×10^{-10}. This parameter corresponds to the baryon density and controls the rate at which nucleons collide and react; from this it is possible to calculate element abundances after nucleosynthesis ends. Is the production of nuclei other than those of the lightest isotope of hydrogen (hydrogen-1, 1H, having a single proton as a nucleus).

The initial creation of hydrogen atoms at 10-100 seconds fusion of nuclei proceeded for some additional minutes to be responsible for the

formation of most of the universe's helium as the isotope helium-4 (^{4}He). Hence, hydrogen expansion created a hot and dense space to sustain fusion reactions for another minutes for unstable nuclei decay and survival ^{3}He and ^{7}Li.

The study of the CMB distribution over space suggests a rather high homogeneity distribution of hydrogen molecules and leads to the proposition that inflation was necessary to explain its relation with BBN. The emerging differential densities by the thermodynamic of molecular kinetics producing vibrational, rotational and translational energy as caloric event at the 3.8×10^5 years of the universe emit CMB as a black body thermal radiation and the concept of homogeneity corresponds mainly to the differential densities in the distribution of hydrogen atoms, that latter resulted in galactic and *voids* distending space.

A differentiable emission of electromagnetic radiation occurs at about 5×10^8 years in the hydrogen fusion reactions, starting the primordial stars. Accordingly, only when reaching these stages could be observed the Hubble's law of distancing by galactic recess.

Hence, the spatial distribution between the wave shape and intergalactic distances could differentiate the predominance of Lyman-α, Quasars, Young blue Galaxies, old red galaxies and nearby galaxies.

At low scales there are fractal behaviors [4]. The Navarro-Frenk-White model has shown that a slowing logarithmic changing curve for an energy density model could also include rotational curves about flatness for the larges scales [5].

The non-linear electromagnetic relation could occur in a vortical high energy dense plasma, due the conservation laws in classical and quantum electrodynamics (QED), which only display linear U(1) symmetry [6].

The conceptualization of flatness implies a dissipative flat state for galactic matter attenuated by a bottleneck dimension of the integrative process of light emission link to the loss of matter by nuclei reactions, indicating that overall expansion involve loss of gravity with recess expanding space link to the PDC of photons in splitting and volume increase. Thus, a cosmological constant in expansion is determined by the recoil force implicit in the Hubble's law. The latter involves space emerging and distancing as a function of photon splitting with wavelength elongation, which could be flat if maintaining a proportional ratio between decreasing enthalpy and increasing entropy, which is not proposed by dark energy.

Thermal radiation could be explained by the entropy generated by enthalpy decrease, associated to the dissipative state of matter. Thus, leads to a different conclusion, and the localization of entropy in *voids* results in a decrease rate of kinetic energy diluted by cooling expressed by the momentum of *voids* pressure over galaxies, without any response to the attractive force of galactic gravity.

Expansion decreases the wavelength which in terms increases the dimensionality of the photons. Hence, the gravity created by galaxies results in hydrogen fusion and emission of light. The wavelength of these photons increases and dimensionally could be scaled by parametric down-conversion (PDC) in recurrent cyclic process of photon splitting and elongation cascade (PSEC) in sequence: 2^n ($n = 0, 1, 2\ldots$).

In each stage, the energy per quantum was reduced by half compared to the previous period and the number of photons became doubled. Hence, in spherical projection $\frac{V_2}{V_1} = 8$ per photon, two photons V=16.

The process is not limited by the velocity of light, because they involve transitions of the enlargement of the emerging *voids* space. Accordingly, the number of cycles found for the elapsed time, from the initial to the present, plays the role as a force lacking response to gravity. The heat value density decreases by enlargement of its wavelength within *voids*, producing a cooling leading to farther enlargement and increasing its pressure over the galactic contours.

The virtual energy could be treated as a local parametric up-conversion (PUC) input

equilibrating the predominant PDC to support the flatness of the universe. Hence, the Casimir experiment reflects that in the laboratory the contraction of the space between two electromagnetic plates by PUC could allow the low energy CMB permeating everywhere allows a lower number of higher energy photon could emerge.

At has been shown the experiment decreases the larger CMB volume of photon localization in a PUC relation decreasing their number at the initial 100% volume of photon localization. Hence, results in the emission of a much smaller number of higher frequencies photons, only compressed into a 6.25% volume. These higher frequency photons allow that by their smaller volume of localization, could escape the internal space of the parallel plates. Thus, by only a local manifestation of the Casimir effect decreases the possibility of virtual energy emerging from space.

The gravitational center could be distended and deviates from the superposition with the central axis of rotational movement and lead to the dispersion in between local position and velocity, as expected from quantum mechanics.

Thus, the contribution of angular momentum to the primordial universe in a three dimensional quantification confers spin to the particles' axis, allowing their distention within elliptical configurations between two focuses. In quarks these may be characterized by the asymptotic configuration that allow pulling vs contraction, results in the multiplication of quarks.

An angular momentum transfer would occur during the deceleration of an initial rotational state of the Planck bosons, participating on the uncoupling of forces. The sense of rotation skews the symmetric relationships between pair of charged particles.

In this one, a curvature moves outward when mass accelerates, producing by stretching and compacting space-time emergence of gravitational waves.

At the outward frontiers that curve the universe rotational effect produce angular momentum, which favors that the velocity of expansion produces an energy overflow from the tendency to approach the velocity of light (*c*) and create inertial mass.

Hence, allowing vestigial gravitational waves to participate in the redshift values associate to an apparent *c*. On the other hands, the pressure from *voids* and the reaching of the outward frontier of expansion, produce the inwardly contraction of individual galaxies in which the rest mass and the inertial mass of the rotational state creating angular momentum. Thus, sums up as a greater gravitational field conditioning matter curvature to increase. Hence, this new understanding of the role played by the cosmological constant requires to be correlated to the percentage contributions of thermal radiation and gravity in a dissipative rate of critical density value (flatness).

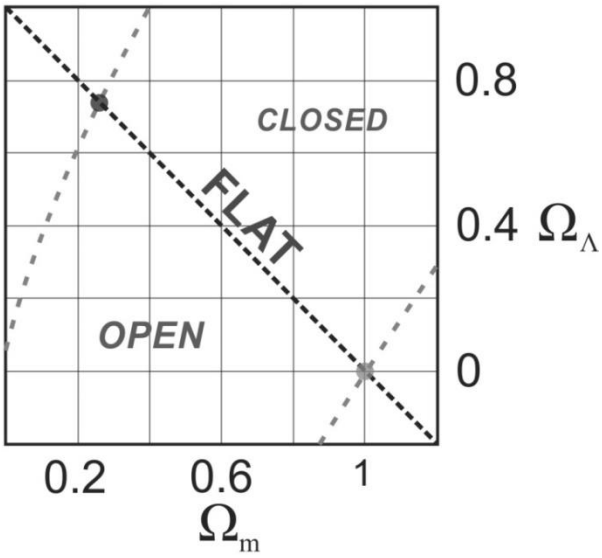

Figure 1: current fractional matter density (Ω_m) vs cosmological constant density (Ω_Λ).

Thermodynamic equilibrium is avoided by coupling the recess of galaxies according to Hubble's law, acting by impulse association to the recoil generating the space as entropy distending at a much larger rate incrementing the volume of the *voids*, diluting their internal heat density. The latter, cooling effect could act therefore as if would be

open to emission of entropy out of the thermodynamic system, which is not because is internalized due to the fact that the universe is self-contained and not communicated with the external nothingness.

Gravitational waves and its incidences over the plasma state produce baryon acoustic oscillations along the universe, with contributions to the primordial energy dissipation thermodynamics state that can be treated by acoustic inhomogeneity of the photons distribution.

Conclusions

The cosmological constant may predict that rather of a force opposed to gravity may appear thermal radiation ignoring it and still supporting flatness. In this case a decreasing curvature in the universe would be coupled to the increase of entropy and decrease of enthalpy, with the constant dissipation of matter and photons maintaining a critical density.

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