Space Expansion by Mass-Energy Conversion

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Abstract

This paper presents solution of caculating dark-energy and its distribution.

Start with two assumption.

1. Imagine the material that emit energy by state of light. It needs space because it has the characteristic of particle. In this situation, were if not for space, there is no energy.
2. Space expansion is kind of ballon expansion.

1 Sum of energy-expansion caused by mass-energy conversion

1.1 Definiton of Sum of energy-expansion

"X distance" is the distance from energy-generating material before expansion that we can randomly set. "Y distance" is the distance from energy-generating material after expansion. "Sum of energy-expansion($\sum exp$)" is the distance value originated from the space that energy demands as minimum. And its value vary by "X distance". Assume that X$\leq$(the maximum extent of energy-generating material's gravitational field). Then Y distance = X distance + distance change by decrease of mass + $\sum exp$. But in past, we didn't consider third term and this cause error of predictable distance as known as dark-energy problem. So this time i will define this new term and predict change of astronomical unit for example.

1.2 Proportional expression of Sum of energy-expansion and its coefficient

In this paper, F denotes gravity formula of newton that expressed in $\frac{GMm}{r^2}$. M is the mass of energy-generating material and m is the other one. But in this paper we can define m in different way, "sum of loss of mass of point paticles". And let the point paticles place in multiple of R_s(Schwarzschild radius) or $\sum exp$. F is proportionate in product of mass and is inversely proportional in square of distance. Buf if M and m are fixed, F is inversely proportional in square of distance. Thus, F is inversely proportional in square of $\sum exp$. However, when we consider R_s as distance value, it is uncertain because its value vary by m. But we can consider m as constants. For example, imagine certain R_{sa} that is 0.01m and set R_{sb} that is 0.1m determinded by m. Then F_b will be F_ax$\frac{\frac{1}{(0.1)^2}}{(0.01)^2}$. Thus, if mass m fixed, F is inversely proportional in square of R_s.

$F \propto \frac{1}{X^2}$ thus, $F = \frac{k}{X^2}$
$F \propto \frac{1}{R_s^2}$ thus, $F = \frac{k'}{R_s^2}$
$F^2 = \frac{kk'}{(XR_s)^2}$ thus, $F \propto \frac{1}{XR_s}$
$\sum exp \propto \frac{1}{\sqrt{F}} \propto \sqrt{XR_s}$ thus, $\sum exp = k'' \sqrt{XR_s}$

A negative binding energy greater than the mass of the system itself would indeed require that the radius of the system be smaller than:
$R \leq \frac{3GM^2}{5c^2} = \frac{3R_s}{10}$[1,2]
If it is smaller than $\frac{3R_s}{10}$, outside get pressed by negative binding energy. Thus, stable state of energy can be the distance of $\frac{3R_s}{10}$. According to assumption-1, energy(only if it is state of light) cannot escape out of R_s. So R_s is the minimum distance without unnecessary space for light. So If we set R_s for X distance, we obtain $\frac{3R_s}{10}$ for $\sum exp$. Assign this result to $\sum exp = k\text{"}\sqrt{XR_s}$, we obtain $k\text{"} = \frac{3}{10}$. Thus, $\sum exp = \frac{3\sqrt{XR_s}}{10}$

2 Problems that we can solve using new term

1. Representatively we can explain why galaxy motion has error value.
2. 2004 analysis of radiometric measurements in the inner Solar System suggested that the secular increase in the unit distance was much larger than can be accounted for by solar radiation, 15 ± 4 meters per century[3,4]. This is same phenomenon with dark-energy problem and it can be caculated by $\sum exp$ setting $X = AU, R_s = \frac{2G\Delta m}{c^2}$.
3. We maybe can explain why inflation happen but it is uncertain expectation.

3 References

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