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Subject: paper for Vixra
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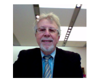


9 Attachments, 99 KB

Simple proof that dark energy is back-from-the-future Wheeler-Feynman Hawking-Unruh de Sitter horizon black body radiation.

Abstract

The dark energy accelerating our observable patch of the multiverse is Wheeler-Feynman Hawking-Unruh black body radiation back from our future de Sitter cosmological horizon. This horizon is also a hologram computer along the lines suggested by Seth Lloyd at MIT. The Stefan-Boltzmann-Planck blackbody radiation law is that the energy density ~ T^4, therefore, as expected, the advanced Wheeler-Feynman Hawking radiation density at the future horizon is the Planck value hc/LP^4 and it is redshifted back from our future to us at hc/ΛLP^2.

end of abstract

The puzzle is why we see the dark energy density as hc/ALp^2 when that is what it is at our future de Sitter horizon. The issue is how to correctly compute the gravity and cosmological frequency shifts for advanced Wheeler-Feynman Hawking-Unruh radiation as compared to retarded radiation - in a way consistent with John Cramer's transaction.

Our intuition from the Schwarzschild solution fails for the de Sitter dark energy solution for static LNIF detectors ("fidos" Susskind) because the former has 1/r dependence with us at r ---> infinity outside the event horizon and the latter has r^2 dependence with us at r = 0 inside the observer-dependent event horizon.

Also in terms of Susskind's "frefo" LIF comoving detectors with zero peculiar velocity (Tamara Davis PhD online) relative to the Hubble flow, we have a very different story. From http://en.wikipedia.org/wiki/Redshift

Calculation of redshift, z

Based on wavelength

$$z = \frac{\lambda_{\mathrm{obsv}} - \lambda_{\mathrm{emit}}}{\lambda_{\mathrm{emit}}}$$

$$1 + z = \frac{\lambda_{\mathrm{obsv}}}{\lambda_{\mathrm{emit}}}$$

Based on frequency

$$z = \frac{f_{\mathrm{emit}} - f_{\mathrm{obsv}}}{f_{\mathrm{obsv}}}$$

$$1 + z = \frac{f_{\mathrm{emit}}}{f_{\mathrm{obsv}}}$$

Cosmological redshift	FLRW spacetime (expanding Big Bang universe)

$$1 + z = \frac{a_{\mathrm{now}}}{a_{\mathrm{then}}}$$

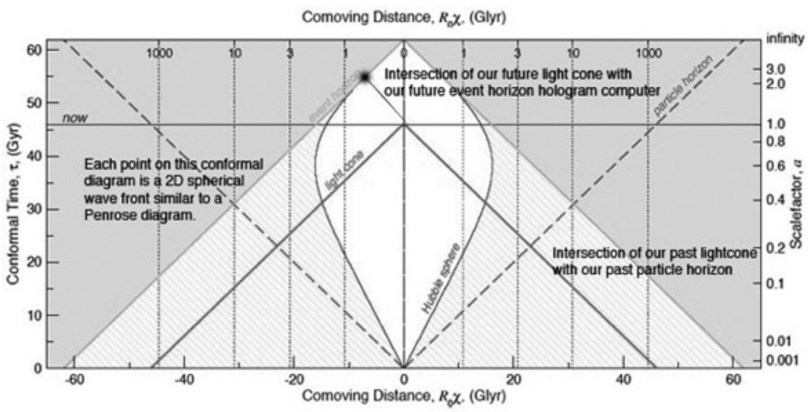
for de Sitter a(t) = e^(2Λ^1/2ct)

ds^2 = c^2dt^2 - a(t)(Euclidean metric)

"flat slicing"

http://en.wikipedia.org/wiki/De_Sitter_space

For



Consider back from the future Wheeler-Feynman Hawking-Unruh thermal radiation from our future de Sitter horizon assuming a comoving frefo source. a(then) >> a(now), therefore

1 + z = a(now)/a(then) << 1

so that z is negative ---> -1, i.e. a cosmological blue shift for advanced radiation

On the other hand for "fido" static LNIFs

Gravitational redshift any stationary spacetime (e.g. the Schwarzschild geometry)

$$1 + z = \sqrt{\frac{g_{tt}(\mathrm{receiver})}{g_{tt}(\mathrm{source})}}$$

(for the Schwarzschild geometry,

$$1 + z = \sqrt{\frac{1 - \frac{2GM}{c^2 r_{\mathrm{receiver}}}}{1 - \frac{2GM}{c^2 r_{\mathrm{source}}}}}$$

OK here we are are at r --> infinity, therefore

1 + z ~ (1/1 - 2GM/c^2r_{source})^1/2

> 1, i.e. z is positive - a redshift for retarded radiation coming to us in our past light cone.

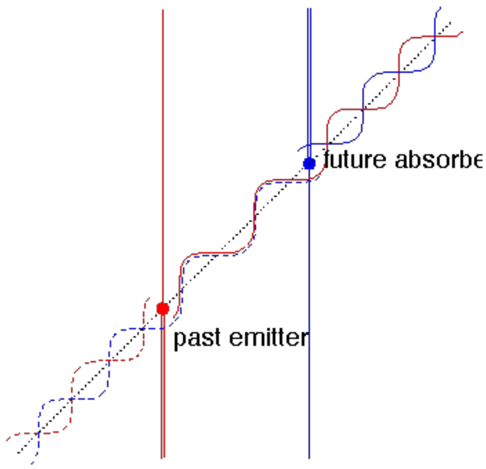
On the other hand, suppose we send retarded radiation to the black hole along our future light cone.

Now we have

1 + z = (1 - 2GM/c^2r_{receiver})^1/2 < 1

z negative i.e. the light we send is blue shifted relative to a local static LNIF fido detector.

But now consider the Cramer transaction.



Advanced light back from our future must be redshifted back to what our original retarded signal was. Does this work?

yes, we have a 1 in the numerator and $z > 1$

The metric is static, so the time order of sender and receiver does not matter.

Next consider our real universe in which only our future universe approximates de Sitter not our past universe as in Tamara Davis's fig 1.1c modified by me above.

$1 + z = [(1 - \Lambda r^2 receiver)/(1 - \Lambda r^2 source)]^{1/2}$

We at $r = 0$ send retarded radiation along our future light cone to our future horizon

$1 + z = [(1 - \Lambda r^2 receiver)]^{1/2} < 1$

\
therefore z is negative, the retarded radiation from us is blue shifted for a static LNIF fido detector at the horizon in contrast to the comoving frefo detector.

For advanced radiation back from our future event horizon

$1 + z = [(1/(1 - \Lambda r^2 source)]^{1/2} > 1$

$z > 1$ redshift as expected.

However, we still have a problem.

$f_{emit}/f_{observe} = 1 + z$

$= [(1/(1 - \Lambda r^2 source)]^{1/2}$

$f_{emit} = f_{observe}/(1 - \Lambda r^2)^{1/2}$

In fact we observe

$f_{observe} \sim c\Lambda^{1/4}/(L_P)^{1/2}$

this requires

$1/(1 - \Lambda(\Lambda^{-1/2} - L_P)^2)^{1/2} \sim 1/(1 - 1 + L_P\Lambda^{1/2})^{1/2} = 1/L_P^{1/2}\Lambda^{1/4}$

Therefore

$f_{emit} = c\Lambda^{1/4}/L_P^{1/2}L_P^{1/2}\Lambda^{1/4} = c/L_P$

however

$f \sim T_{Unruh} \sim g$(proper acceleration of the LNIF fido)

The Stefan-Boltzmann-Planck blackbody radiation law is that the energy density ~ T^4, therefore, as expected, the advanced Wheeler-Feynman Hawking radiation density at the future horizon is the Planck value hc/L_P^4 and it is redshifted back from our future to us at $hc/\Lambda L_P^2$.