Report

A Brief Comment on Hawking and Black Holes

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Abstract

We vindicate in this comment, Hawking's recent assertion in his latest paper that Black Holes do not have event horizons.

Recently Stephen Hawking has argued that Black Holes do not exist, in the sense that the all important event horizon does not exist [1]. This has raised a debate amongst Black Hole researchers. In this comment we would like to claim that Hawking might be right, based on a quantum of area approach to Black Holes in the spirit of Quantum Gravity. This has been argued at length by the author [2, 3]. Here we deal with Planck scale phenomena, where there is a quantum of area $\sim l_P^2$, the square of the Planck length. This approach leads independently to the Hawking-Beckenstein temperature.

Further we know from theory that [4]

$$\frac{dM}{dt} = -\frac{\beta}{M^2}, \tag{0.1}$$

M being the mass of the Black Hole and β suitably defined. In this case we also have

$$\sqrt{N}m_P = M,$$

where the Black Hole consists of N quantum of area, that is Area $\sim Nl_P^2$ [5] and m_P is the Planck mass. Then from (0.1) immediately follows that

$$\frac{dM}{dt} = m_P/t_P,$$

$$M = (m_P/t_P) \cdot t, \tag{0.2}$$

where t is the Hawking-Beckenstein decay time and t_P is the Planck time.

From (0.2) we can see that for the Planck mass itself, t is the Planck time. For the universe as a whole the above gives the lifetime t as $10^{17} secs$ that is the age of the universe itself!

What is interesting is that (0.2) also shows that the Black Holes with a mass less than or equal to $10^{38} gms$, that is which are up to 10^5 times as massive as the Sun, there is no realistic lifetime. Thus Hawking's result gets this surprising confirmation from a "Quantum Gravity" approach.

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References

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