

To: Jeffrey Epstein[jeevacation@gmail.com]:

From: Lisa Randall

Sent: Fri 10/2/2009 9:41:49 PM

Subject: Re:

I think I'm reaching the limits of my ability to disentangle grammar and spelling but here goes:

Jeffrey Epstein wrote:

> thanks , question , what does it look like if time is running backward
> , wouldn't it be decelerating,, into flat space from the singularity
> outward,, therefore explosion than
[then]

expansion.

It looks like big bang, not inflation before horizon. So not explosive expansion.

but always slowing after

> crossing the horizon .

after crossing horizon there isn't really a cosmological interpretation anymore. Time and space have switched back.

looking in reverse it appears things accelerate

> as they approach,, charged would be as a result of the deceleration.
don't understand this last comment.

>

> On Fri, Oct 2, 2009 at 5:27 PM, Lisa Randall

> <randall@physics.harvard.edu <mailto: [REDACTED]>> wrote:

>

> Hi Jeffrey. It was interesting-as always.

> For your question, let's first straighten out that there are 3 types
> of bhs we might be discussing: Schwarzschild, charged, and Kerr. I
> didn't say much about Kerr--I mostly discussed charged-- since they
> are changing with time and a bit more complicated but indeed they
> have 2 horizons (just like charged black holes).

>

> Two horizon scenario means time and space switch twice so at
> singularity you are back to ordinary time space identification. So
> let's first just consider Schwarzschild (uncharged, not rotating). In
> that case you are on the right track. Reversing time and coming from
> the singularity, it pretty much looks like a 2d big bang scenario
> (with the other 2d in a compact sphere). Space expands out until you
> reach the horizon and eventually goes over into flat space. It's not
> really accelerated expansion but still somewhat along lines you
> suggested.

>

> If there are two horizons (charged black hole case) and you are in
> between them (we called this Whoville because it looks like space
> has shrunk to zero but actually spacetime has not and there is a
> finite time between them so there's a whole world invisible to the
> outside) what happens is you alternate between big bang and big
> crunch in the full extended spacetime.

>

>

>

> Jeffrey Epstein wrote:

>

> Lisa . thanks,, for your time,and patience if i understand the
> Kerr equations , and your explanation correctly , time and space
> appear to exchange coordinates , inside a black hole. , that

> assumes that time is unidirectional. doesn't it appear that if
> you ran negative time , it would look like any other explosive
> transaction. great acceleration. emanating from the second
> horizon outward slowing to a mere expansion . It would appear
> that " time" got shot out of the black hole. created by a space
> collapse at the singularity.

>
> --
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