

**From:** Jeffrey Epstein <jeevacation@gmail.com>  
**To:** Lisa Randall <[REDACTED]>  
**Subject:** Re:  
**Date:** Sun, 04 Oct 2009 16:34:02 +0000

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2pm?

On Sun, Oct 4, 2009 at 11:21 AM, Lisa Randall <[REDACTED]> wrote:  
Any availability in the spacetime continuum today or tomorrow?

Jeffrey Epstein wrote:

joking, for me , space and time are disconnected as my fingers hunt for keys

On Fri, Oct 2, 2009 at 6:00 PM, Lisa Randall <[REDACTED]>  
<mailto:[REDACTED]>> wrote:

Oops. Problem of email. No offense intended. I was really a little confused. Or were you joking?

Jeffrey Epstein wrote:

sorry,

On Fri, Oct 2, 2009 at 5:41 PM, Lisa Randall

<[REDACTED]>  
<mailto:[REDACTED]>  
<mailto:[REDACTED]>  
<mailto:[REDACTED]>>> wrote:

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

<[REDACTED]>  
<mailto:[REDACTED]>  
<mailto:[REDACTED]>  
<mailto:[REDACTED]>>  
<mailto:[REDACTED]>  
<mailto:[REDACTED]>  
<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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