

**To:** Jeffrey Epstein[jeevacation@gmail.com]  
**From:** Lisa Randall  
**Sent:** Sun 10/4/2009 6:30:43 PM  
**Subject:** Re:

What happened? I'll skip bad spacetime continuum joke.  
I'll be back about 6. Let me know if you will have time.

Jeffrey Epstein wrote:

> if 2 is good is there a number to call?

>

> On Sun, Oct 4, 2009 at 12:34 PM, Jeffrey Epstein <jeevacation@gmail.com>

> <mailto:jeevacation@gmail.com> wrote:

>

> 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]>> 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

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> <[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

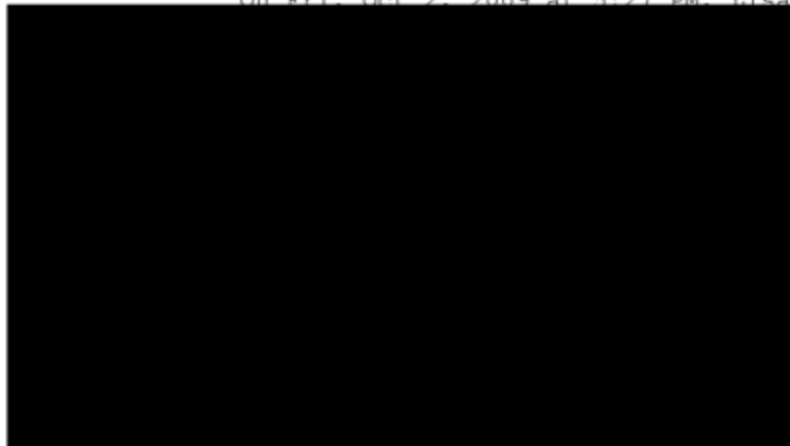
> time is  
> running  
> backward , wouldn't it be decelerating,, into  
> flat space  
> from  
> the singularity outward,, therefore explosion than  
>  
> [then]  
> expansion.  
> It looks like big bang, not inflation before  
> horizon. So not  
> explosive expansion.  
>  
> but always slowing 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



>>>> 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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