

**To:** Jeffrey Epstein[jeevacation@gmail.com]  
**From:** Lisa Randall  
**Sent:** Sun 10/4/2009 6:04:41 PM  
**Subject:** Re:

you there?

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]  
>  
>

> 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]  
>  
>

> 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]  
>  
>

> 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



> 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:  
> Schwarschild, 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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