Subject: Re: LQG strings draft
From: Thomas Van Riet <thomas.vanriet@kuleuven.be>
Date: 29/01/24, 12:21 am
To: dvaid79 <dvaid79@gmail.com>
CC: "luigi.tiraque@gmail.com" <luigi.tiraque@gmail.com>

Hi to you both

Sorry for the delay. I read the draft in detail till where the actual idea of a different quantisation emerges. I have various comments about that part, but I am not sure I should send them all. The writing style is good, but I don't quite agree with all details. But that is neither weird given the long history of debate.
I must say I am confused about the proposal of the paper as such. But don't let that be in your way. I just fail to see the logic. The central dogma is what motivates you to change the Polyakov action. I do not see the logic behind the central dogma and can write a long text about that. But let me take it for granted since it forms the motivation. Then my main worry is why the central dogma should be applied to the worldsheet? The central dogma applies to physical spacetime. The worldsheet instead is "as geometric" as the worldline quantisation of a particle, which we also do not change. There is no notion of planck scale in the 2d worldsheet. The rigour of the perturbative string is really the rigor of 2d conformal field theory. The only weird thing is that in the perturbative string we gauge the weyl symmetry, which turns it into a CFT with ghosts such that the total central change vanishes. But this still falls within the realm of 2d (S)CFT.

About the central dogma and LQG: for me the essential difference between LQG and ST is that LQG is somehow focused on the fact that the Ashtekar variables allow one to go around some of the problems of quantizing a highly non-linear theory with diffeo constrains, but it ignores the coupling (Newton constant) has negative mass dimensions and is shouting for extra degrees of freedom at high energy. ST instead gives up on the conventional picture that the fundamental variables are related to the space-time metric and finds that an infinite tower of modes UV completes gravity with corners in which you indeed have a classical metric for the string zero modes. But only in corners. Much of what you get out of the worlsheet does not need to have a classical metric interpretation. Think of T-duality: a circle that wants to shrink below the string length is effectively a circle that opens up again. So there is a minimal length (your central dogma) but it is a regrouping of degrees of freedom at high energies.

Anyways, let me not go into this decades-old discussion. Maybe once over a drink at a conference 😉 if we ever meet.

To summarize: It is great you try to merge two approaches of QG. Go for it! Don't let my cricticism be of weight. I did not spend much time thinking about it and I just share my first thoughts, which are most likely not too profound.

Best

Thomas

From: dvaid79 <dvaid79@gmail.com>
Sent: Friday, January 19, 2024 3:58 PM
To: Thomas Van Riet <thomas.vanriet@kuleuven.be>
Cc: luigi.tiraque@gmail.com <luigi.tiraque@gmail.com>
Subject: Re: LQG strings draft

Sure. Take your time. I saw your tweet about juggling six different academic tasks at the same time.

Best,

Deepak Vaid https://www.quantumofgravity.com

-------- Original message --------
From: thomas van riet <thomas.vanriet@kuleuven.be>
Date: 19/01/2024 8:20 pm (GMT+05:30)
To: dvaid79 <dvaid79@gmail.com>
Cc: luigi.tiraque@gmail.com
Subject: Re: LQG strings draft

Hi guys

Sorry for my delay. A bit too much on my plate. But I promise to look at it one of these days

Best
thomas

On 11/01/2024 20:33, dvaid79 wrote:

> Hi Thomas,
>
> This is the paper which I had mentioned to you some days back on Twitter. It's obviously very much in a draft stage, but I hope that from the introduction and the remaining material it should be clear what it is we are trying to do.
>
> There are two YouTube videos also, of discussions between me and my collaborator Luigi, where I outline the broad goals and motivations of the work.
>
> https://youtu.be/RF9ph9K9YqA
>
> https://youtu.be/zfabwLMFKgk
>
> I hope you will be able to spare some time and have a look at our work and offer whatever criticisms or suggestions you might have. And please don't hesitate to tell us that we are completely wrong, if that is your conclusion.
>
> Best,
>
> Deepak
>
> Deepak Vaid https://www.quantumofgravity.com