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From: SourceCodeOf_HumanGenome (Original Message) Sent: 4/10/2006 12:02 AM

The possibility that a quantum history is entangled is first pointed out by Yuuichi Uda on 27 May in 2005.

You can see here what is an entangled quantum history,
and the theory for entangled quantum histories.

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From: SourceCodeOf_HumanGenome Sent: 9/12/2007 12:15 AM

The main idea of the grammar
for the theory of Entangled Quantum History
is to treat each time as if it were a degree of freedom.

By doing so, the notion 'entanglement' for a quantum state
is expanded to be applicable to a quantum history.

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From: SourceCodeOf_HumanGenome Sent: 9/12/2007 2:28 PM

In contrast with the Uncertainty Principle of Quantum Mechanics,

the theory of Entangled Quantum History
is characterized by the concept
to be called 'Unfinishedity Principle'.

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Sent: 7/17/2008 9:56 PM

This message has been deleted by the manager or assistant manager.

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From: SourceCodeOf_HumanGenome Sent: 7/18/2008 12:06 PM

To explain the new grammar for entangled quantum history,
here I present the abstract for the 2006 spring meeting
held by the physical society of Japan.
The original one was written in Japanese.

I have corrected it a little below.

As a practice of grammatism,
I propose an improvement of the grammar of quantum mechanics this time.
This improvement is essentially applicable to all quantum theories including quantum field theory, not restricted to quantum mechanics.
It is well known that a quantum state of a system with n degrees of freedom
is represented by a mapping (wave-function) from **R**^n to **C**.
Such a wave-function corresponds to the proposition,

The quantum state of the first degree of freedom is ψ(□,1)
and the quantum state of the second degree of freedom is ψ(□,2)
and ・・・
and the quantum state of the n-th degree of freedom is ψ(□,n),

if

$$\Psi(x(1),x(2),\cdots,x(n))=\psi(x(1),1)\psi(x(2),2)\cdots\psi(x(n),n).$$

That is, it corresponds to the proposition,

∀j; The quantum state of the j-th degree of freedom is ψ(□,j).

Such a quantum state is called an disentangled quantum state,
and a quantum state is not necessarily disentangled generally.
I have not said anything new yet.
Now, imitating above, let us represent a quantum history
of a system with one degree of freedom
by a functional which maps each mapping from **R** to **R** onto a complex number.
This is the new grammar that I propose this time.
Let Φ represent a quantum history,
and we feel that it corresponds to the proposition,

∀t; The quantum state at time t is φ(□,t),

if

$$\Phi[f]=\prod_t \varphi(f(t),t).$$

I call such a quantum history a disentangled quantum history.
Here I propose an assumption
that a quantum history is not necessarily disentangled generally.
However infinite product should not appear
not at feeling level but in a rigorous expression,
because it does not look real.
So, let us think that Φ is disentangled when

$$\Phi[f]=\exp[\alpha\int dt\varphi'(f(t),t)].$$

The meaning of φ' is determined by the relation

$\forall x \in R; \forall x \in R; \varphi(x,t) = \exp \varphi'(x,t)$.

φ is an expression of a quantum history in the grammar of the ordinary quantum mechanics.
α is a new physical constant.

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From: SourceCodeOf_HumanGenome Sent: 7/18/2008 12:15 PM

I made a mistake in the previous message.

Wrong : $\forall x \in R; \forall x \in R; \varphi(x,t) = \exp \varphi'(x,t)$.

Correct: $\forall x \in \mathbf{R}; \forall t \in \mathbf{R}; \varphi(x,t) = \exp \varphi'(x,t)$.

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From: SourceCodeOf_HumanGenome Sent: 7/18/2008 12:31 PM

As for a system with one degree of freedom,
the coordinate-system of the theory of entangled
quantum history is M_{new} such that

M_{new} : { Φ | Φ : { f | f : $\mathbb{R} \to \mathbb{R}$ } → $\mathbb{C}$ } → { h | h is a quantum history },

$$\forall\ \Phi : \{ f \mid f : \mathbb{R} \to \mathbb{R} \} \to \mathbb{C}\ ; \forall\ \Psi : \mathbb{R}^2 \to \mathbb{C}\ ;$$

$$[\ \exists\ \phi : \mathbb{R}^2 \to \mathbb{C}\ ;$$

$$[\ \forall\ f : \mathbb{R} \to \mathbb{R}\ ; \Phi[f] = \exp[\alpha \textstyle\int dt\ \phi(f(t), t)]$$

$$\text{and } \forall\ x \in \mathbb{R}\ ; \forall\ t \in \mathbb{R}\ ; \Psi(x,t) = \exp\ \phi(x,t)\ ]\quad]$$

$$\Rightarrow\ M_{new}(\Phi) = M_q(\Psi)$$

where M_q is the coordinate-system of the ordinary quantum mechanics and α is a new physical constant.

M_q : { Ψ | Ψ : $\mathbb{R}^2 \to \mathbb{C}$ } → { h | h is a quantum history which is not entangled }

Note that (the range of M_{new}) ⊃ (the range of M_q).
An entangled quantum history is
what is in the range of M_{new} but is not in the range of M_q .

【SEOtext】As for a system with one degree of freedom, the coordinate-system of the theory of entangled quantum history is Mnew. where Mq is the coordinate-system of the ordinary quantum mechanics and α is a new physical constant. Note that (the range of Mnew) ⊃ (the range of Mq). An entangled quantum history is what is in the range of Mnew but is not in the range of Mq.

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From: SourceCodeOf_HumanGenome Sent: 7/19/2008 7:01 PM

As for a system with one degree of freedom,
my new grammar represents a quantum history
represented by Ψ(□,t) in the grammar of the ordinary quantum mechanics
by a functional Φ such that

$\Phi[f] = \exp[\alpha \int dt \varphi(f(t),t)]$; $\Psi(x,t) = \exp \varphi(x,t)$ ･･･※

Now we want to know what equation Φ is to obey.
It looks real that the new equation reduce
to the ordinary schrodinger equation when ※ holds.
Using this fact as a guide, I tried making the following equation.

$$\frac{i\hbar}{\alpha}\lim_{\varepsilon\to 0}\frac{\Phi[f']-\Phi[f]}{\varepsilon}$$

$$=\int_{-\infty}^{\infty}dt\left\{\frac{1}{2m}\left[-\frac{i\hbar}{\alpha}\frac{\delta}{\delta f(t)}\right]^2+V(f(t))\right\}\Phi[f]$$

$$\text{where}\quad f'(t)=f(t-\varepsilon)$$

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From: SourceCodeOf_HumanGenome | Sent: 7/21/2008 5:31 PM

To derive the new equation exhibited in the previous message,
I used the guide mentioned there only as a heuristic one.
I have not yet proven that
the new equation reduce to the ordinary schrodinger equation when ※ holds.
You can see how I did in the following manipulation.

$$\Psi[x]=\exp\left[\delta(0)\int_{-\infty}^{\infty}dt\,\ln\Psi'(x(t);t)\right]$$

$$\Psi[x(\Box-\varepsilon)]=\exp\left[\delta(0)\int_{-\infty}^{\infty}dt\,\ln\Psi'(x(t-\varepsilon);t)\right]$$

$$=\exp\left[\delta(0)\int_{-\infty}^{\infty}dt\,\ln\Psi'(x(t);t+\varepsilon)\right]$$

$$\lim_{\varepsilon\to 0}\frac{\Psi[x(\Box-\varepsilon)]-\Psi[x(\Box)]}{\varepsilon}$$

$$=\delta(0)\int_{-\infty}^{\infty}dt\,\frac{1}{\Psi'(x(t);t)}\cdot\frac{\partial\Psi'(x(t);t)}{\partial t}\Psi[x]$$

$$=\delta(0)\Psi[x]\int_{-\infty}^{\infty}dt\,\frac{1}{\Psi'(x(t);t)}$$

$$\times\frac{1}{i\hbar}H\left(x(t),-i\hbar\frac{\partial}{\partial x(t)}\right)\Psi'(x(t);t)$$

$$H\left(x(t),-i\hbar\frac{\partial}{\partial x(t)}\right)=\frac{-\hbar^2}{2m}\left[\frac{\partial}{\partial x(t)}\right]^2+V(x(t))$$

$$\frac{1}{\Psi'}\frac{\partial^2}{\partial x^2}\Psi'=\frac{1}{\Psi'}\cdot\frac{\partial}{\partial x}\left(\Psi'\frac{1}{\Psi'}\cdot\frac{\partial\Psi'}{\partial x}\right)$$

$$=\left(\frac{\partial\ln\Psi'}{\partial x}\right)^2+\frac{\partial^2\ln\Psi'}{\partial x^2}$$

$$\therefore\ i\hbar\lim_{\varepsilon\to 0}\frac{\Psi[x(\Box-\varepsilon)]-\Psi[x(\Box)]}{\varepsilon}$$

$$=\delta(0)\Psi[x]\int_{-\infty}^{\infty}dt\left\{\frac{-\hbar^2}{2m}\left[\left(\frac{\partial\ln\Psi'}{\partial x}\right)^2+\frac{\partial^2\ln\Psi'}{\partial x^2}\right]+V(x(t))\right\}$$

$$\frac{\delta}{\delta x(t)}\psi[x]=\delta(0)\frac{\partial \ln\Psi'(x(t);t)}{\partial x(t)}\psi[x]$$

$$\therefore \frac{\partial \ln\Psi'}{\partial x}=\frac{1}{\delta(0)\psi[x]}\cdot\frac{\delta\psi[x]}{\delta x(t)}$$

$$\left[\frac{\delta}{\delta x(t)}\right]^2\psi[x]=[\delta(0)]^2\frac{\partial^2 \ln\Psi'}{\partial x^2}\psi[x] + \left[\delta(0)\frac{\partial \ln\Psi'}{\partial x}\right]^2\psi[x]$$

$$\therefore i\hbar\lim_{\varepsilon\to 0}\frac{\psi[x(\Box-\varepsilon)]-\psi[x(\Box)]}{\varepsilon}$$

$$=\delta(0)\int_{-\infty}^{\infty}dt\left\{\frac{-\hbar^2}{2m}\frac{1}{[\delta(0)]^2}\left[\frac{\delta}{\delta x(t)}\right]^2+V(x(t))\right\}\psi$$

$$=\delta(0)\int_{-\infty}^{\infty}dt\cdot H\left(x(t),-i\frac{\hbar}{\delta(0)}\cdot\frac{\delta}{\delta x(t)}\right)\psi[x]$$

Reply | 0 recommendations | Message 10 of 12 in Discussion

Sent: 7/21/2008 6:04 PM

This message has been deleted by the manager or assistant manager.

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From: SourceCodeOf_HumanGenome

Sent: 7/21/2008 6:19 PM

It seems difficult for me to prove that
the new equation reduces to the ordinary schrodinger equation when ※ holds.
So, instead of it, first I attempted to prove that
some Ehrenfest like condition follows the new equation.
As a new grammar version of Ehrenfest condition,
I put the following formula.

$$m\frac{d^2}{dt^2}\int Df\,\overline{\Phi[f]}\,f(t)\,\Phi[f]$$

$$=-\int Df\,\overline{\Phi[f]}\,\frac{dV(f(t))}{df(t)}\,\Phi[f]$$

----

where

$$\int Df \equiv \lim_{\varepsilon\to +0}\prod_{n=-\infty}^{\infty}\int_{-\infty}^{\infty}df(n\varepsilon)$$

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From: SourceCodeOf_HumanGenome

Sent: 10/22/2008 9:15 PM

I found that the formula in Message 11 is derived from the equation in Message 8.

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