

Re: Repeatability, scientific method, and probabilistic results

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- *From:* ytyourclothes@xxxxxxxxxxxx
 - *Date:* 13 May 2005 14:55:59 -0700
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Tim Golden wrote:

> Is there a conflict with probabilistic models and the scientific
> method?

No.

> Whereas a simple experiment allows for errors in the equipment and
> allows for probabilistic correction, quantum physics imposes these
> methods on the non-instrumental portion of the experiment.

No.

> Repeatability is a tenet of the scientific method.
> Some will argue that the quantum experiments are repeatable.

They are.

> The type of repeatability is starkly different from earlier work.

Not in the least.

You roll a dice, you get the number "four" with a probability of 1/6.

That is perfectly repeateable.

It has little to do with quantum mechanics.

It simply means you have reached the level of abstraction where there's no further "underlying cause". There's no "mechanism" to explore that would tell you "why" you rolled a "four" this time. You just sometimes do and sometimes you don't. As a matter of fact, you'd suspect some underlying mechanism exactly if/when you were to measure a probability that is substantially different from 1/6.

Most dice you buy at the supermarket, for example, will roll "1" and "6" with a slightly different probability, because the dots are either drilled out (making 6 the lightest face) or painted on (making it the heaviest). But when you find that your particular die will roll 1/6

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just fine then you know you need not look for any further mechanisms. You know that you've taken everything into account and that all further variability in the results is up to chance.

Quantum mechanics simply operates at such a fundamental level, that you encounter this "limit of mechanisms" more frequently and in more contexts.

There is no "quantum repeatability" issue -- whenever things are up to chance, the outcome of the experiment is described in probabilistic terms. That's what is to be expected.

cordially

Y.T.

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• **References:**

- ◆ **[Repeatability, scientific method, and probabilistic results](#)**

◇ *From:* Tim Golden

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