Re: Is State Vector Reduction a 'Process'?

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Aaron Bergman wrote:

> Why do we observe outcomes with probability |<a|psi>|^2? QM
> has no answer for this question.

Let me add my two cents to this debate.

1. results of measurements performed on micro−systems are
inherently statistical/unpredictable. If you prepare twice the same
system in the same state, and measure the same observable,
you may get two different measurement results.

2. Quantum mechanics does not explain the origin of these probabilities.
All QM can do is to calculate these probabilities.
In textbook QM, the formula |<a|psi>|^2 is a postulate, but this
formula can be derived from a more fundamental "quantum logic" approach.
(see chapter 4 in physics/0504062)
If you know the rules of quantum mechanics, you can describe the
state of your system by a vector |psi> in the Hilbert space,
and the measurement by another vector |a>, and calculate/predict
the probability of finding value a in the state |psi> by using above
formula.

3. Quantum mechanics cannot "explain" why each time you measure
observable A in the state |psi> you obtain different values
a_1, a_2, a_3...
QM cannot predict exactly which value will occur next.
It can only predict the probability for each possible outcome.

4. The probabilistic behavior of micro−systems will be explained by a theory that goes beyond quantum mechanics (there is no such a theory, to the best of my knowledge) or, most likely, not explained ever.

Eugene Stefanovich.

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