

"quantum mechanics and experience"--non separability

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I'm reading "Quantum mechanics and experience". It's starting to sink in, and I hope I can use this forum to clarify some points as I go along (I finished reading it, but I'm reading it a second time because there's no way I get it entirely in the first round <g>.)

My big hang-up so far is understanding non-locality/non-separability of 2 particle states. Albert doesn't explain how such a state comes about in the first place. Can I assume that all combinations of 2 particles at a time are NOT in a non-separable state? Then what puts them into that state? And what causes the end of non-separability (i.e., separate reactions of the particles independent of the changes going on in the other particle)? And what properties of the 2 particles are non-separable? (surely not all properties, i.e., location <g>).

Also, I don't understand why Albert makes such a big deal out of non-locality. If two particles are in a "non-separable state" where the color of A is opposite the color of B ($A+B = 0$) is the quantum state of the two particle system, then non-locality seems to follow logically.

In this state neither A's color nor B's color is determined, just the state of the two particle system. So if A is then measured, A-B is still undetermined because B has not been measured yet. When B is finally measured, it will turn out to be "minus A or the opposite of A", unless something is done to change the two particle system, which measuring alone won't do, since A-B is already in a determined state. So B, at the time of measuring of A, is still undetermined, but there is no way (I assume) to confirm that B is undetermined without measuring it. As soon as you measure B, it must be "minus A" per the 2 particle system state.

If the above is true, nothing in that description calls for any "direct, physical" contact between A and B, so non-locality is inherent in having something called a "non-separable" state. You don't even need Bell's theorem to conclude this, do you?

I raise this question because this non-separability seems to me to be very, very much different from incompatible properties of a one particle system. It seems like quantum mechanics is asserting right from the start that there are pairs of properties of a single particle which are 100% incompatible. This seems to be inherent in the physical makeup of the universe.

In contrast, I don't think Albert makes explicit under what circumstances non-separability of two particle systems obtains. Is he saying that non-separability is inherent in all two particle pairs, just like incompatibility is inherent in pairs of properties of one particle systems? Even so, that wouldn't mean that all 2 particle pairs are in a non-separable state, since only specific pairs of properties of a one particle state are incompatible, not all pairs of properties.

So that leads me back to the question of what generates non-separability of two particle systems—and which properties become non-separable under those circumstances (hopefully it doesn't mean that all properties are non-separable in that state)?

Thank you for your explanation(s)!!!