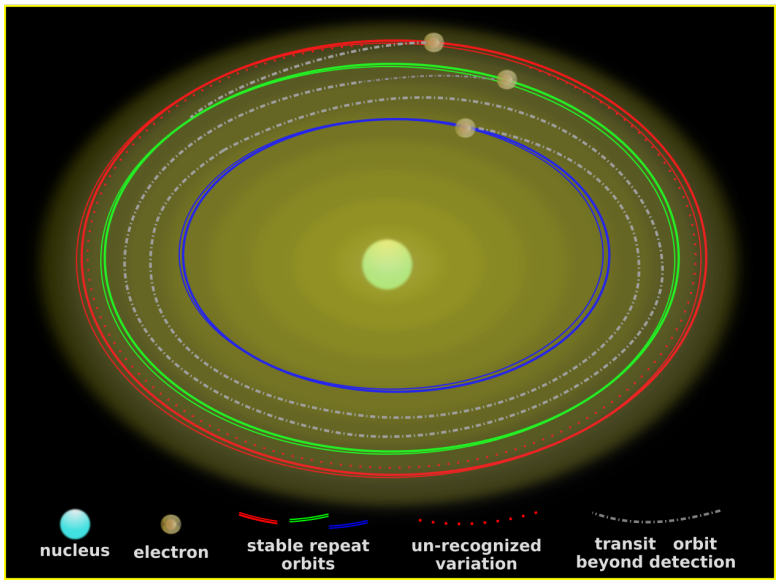
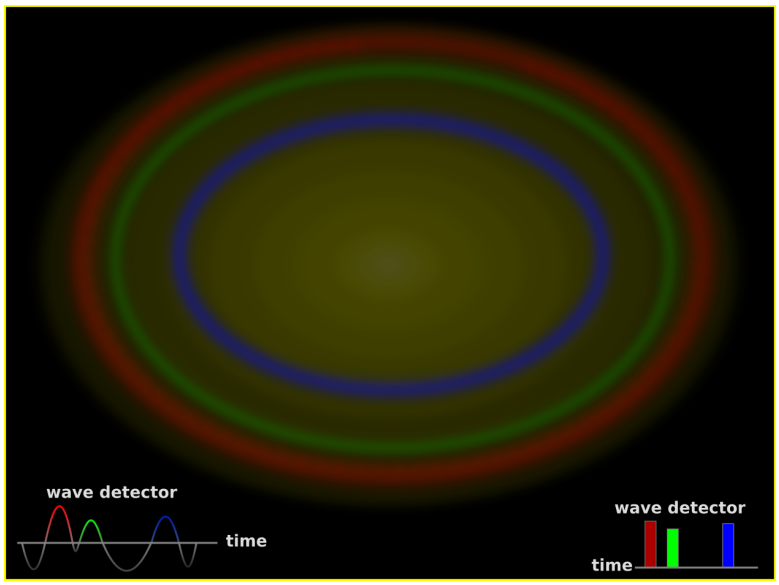
Why Quantum Jump Essay
短論量子爲何跳躍

Cres Huang



Conceptual Image of Orbiting Electron



Electron Jump Shown By Limit of Detection

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Abstract

Quantum jump describes the observation of atomic electron transition from one state to another within an atom. It appears discontinuous as the electron leap from one energy level to another. The issue is, atomic particles are too small and too fast for our detectors to recognize their action and identity. I believe it is the result of the blindness of the detectors not the nature phenomenon.

Certainly, a sudden significant increase of energy in the environment could force the electron to rapidly ascent, or vice versa. However, I believe it's inertia would try to preserve the angular momentum and limit it from jumping straight. Instead it's a smooth spiral trajectory before reaching the new energy level that is balanced with the environment. Then, it would stay on new orbit if the environment remains unchanged. It disappears when it is moving at transition trajectory, then it can be detected again by our sensors when it's trajectory stabilized. I believe the jump is the result of the blindness of the detectors not the nature phenomenon.

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2 Quantum Jump

So far, we remain incapable of study particles on bench top. We can only detect a cloud like image of electron in action. It's trajectory remains hidden from us.We also incapable of watching and identified their individuality. The difficulty is not only studying a particle in motion, but keeping it still is not any easier, if possible. Figure 1 depicts a simplified conceptual atom with single orbiting electron. The electron would repeat it's trajectory when it's environment remain unchanged. Any changes of it's surroundings would alter it's trajectory. It would move up to higher orbit if received extra energy, lower orbit on energy lost, or remain on the same altitude but change in direction if the variation of the environment is not strong enough for it to gain or lost altitude.

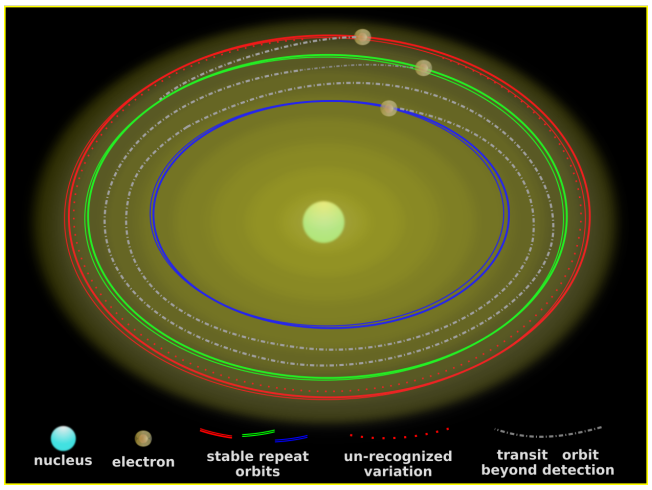

Figure 1: Conceptual Image of Orbiting Electron

By the conservation law, electron would attempt to maintain it's angular momentum if acted on by an external force. Inertia of particle would resist any sudden jump. I doubt it would jump straight up or down to new orbit. It is likely be spiral curve before stabilizes itself at the new orbit. It would appear jump to detector that is unable to see the transition trajectory of particle.

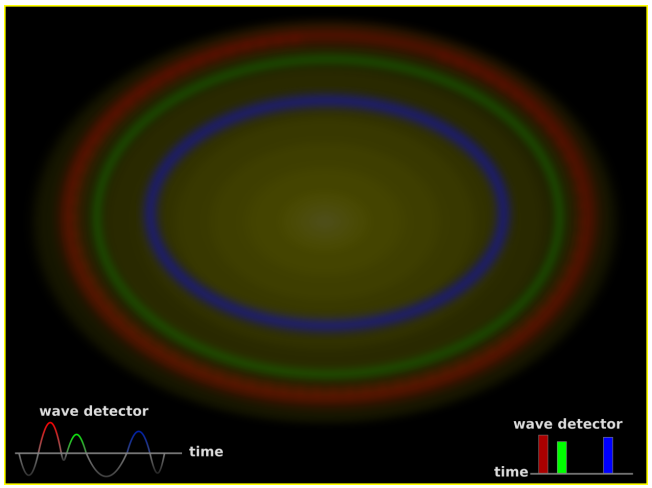

Figure 2: Electron Jump Shown By Limit of Detection

3 Summary

In atomic world, there is the blindness that wee can't see, but also double and long exposure of actions that we can see. Particles are light-speed able beings. Not only we can not identify the runners, the velocity of the runners are faster than our camera. Consider one second of light beam is about 300,000 km long. One nanosecond of light beam is about 30 centimeters, 11.81 inches. Hasn't the particle translated, instead of jump, a vast distance at one nanosecond? I believe it is the sensors can only detect and register the repeated trajectory. Particle would have to revolving on the same orbit long enough. Otherwise, it would not trigger the reaction of the detectors. Transitional trajectory is short, and it does not repeat. It would not be detected and registered by the detector. Hence we see jumps.

None of our detectors provides complete information. What we perceived does not necessary sufficiently describe the physical events of nature. Even we don't fully understand how our vision works. We have a fair idea of the optical illusion. [2] [4] The question is, how we perceive and understand the universe if we could see ultraviolet (UV) light?

I believe particles are most committed and honest in nature. They interact at the most precision with the environment at fundamental level. It could appears chaotic to us due to the details and promptness of atomic world is beyond us. The speed and invisibility of atomic particles prohibit us from getting clear information of their physical properties as well as actions. Our perception of the universe rarely is direct physical interaction. Yet, it is not necessary comprehensible even it is. Instead, it is the information of the physical events collected by detectors. Additionally, information is subject to comprehension and interpretation. Often we fool ourselves by what we believe. Don't we have to look beyond it logically?

4 Appendix

4.1 Event and Information

Events happen in all locations constantly in the universe, which can only be considered infinite. We can only obtain information that is delivered and detectable by our sensors. Not only there are many issues in the transportation of information, but also our capability of perceiving the information. [3]

- An event is subject to a certain location and progression of it's complement. It is space and time referenced activity. It has it's unique identification eternally. It can never repeat.
- The rest of the universe is the complement of an event. Altering the event will alter the universe as a whole.
- At any single moment, there is only one physical location for an event. However, it's information can be delivered to countless observers.
- An event can have many forms of information. However, an event can not be fully described by the combined information collected by all observers. The magnitude and speed of information for never replay events in the universe is beyond any observation. Even delivered information is not all perceivable by observer.
- Information is only the description of the event. It is not the event. For example, john is not you, and you are not john, even your name is John. John is only a nominal description of you. It can never be you, and you can never be john, John.
- Event has it's duration of existence, however, it's broadcasting can outlast it's existence, and never less.
- Physical event occurs as is, however, it's information can deviate from truth. Events happen in all locations constantly in the universe, which can only be considered infinite. We can only obtain information that is delivered and detectable by our sensors. Not only there are many issues in the transportation of information, but also our capability of perceiving the information. We can easily be fooled by what we see.

References

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