

Quantum Uncertainty: Fragmentation in Art, Life & Reality

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“The third dimension is but a shadow cast
by the fourth.”

– Marcel Duchamp

Introduction

In this paper I wish to explore the philosophical implications and metaphorical relationships between quantum theory and art. Few theorists have attempted to broach this subject and at first glance, arcane equations and subatomic debris appear to have little relevance to visual art. But if art is a creative endeavour that reflects human experience and understanding of the universe, then if that understanding changes, so too must the art we create. Art today largely remains a reflection or meditation on a concrete, classical understanding of the universe. Almost everything ever painted, sculptured or drawn is solid, continuous, structured and knowable. But at its smallest units the universe is fragmented, random and uncertain. I wish to examine the impact of this on today's electronic culture and draw parallels with the increasingly fragmented lives we live... and its implications on the art we create.

Looking back: The Renaissance

To understand the future we need to look to the past. The Renaissance was a time when changes swept the Western world, initiated by things that at the time seemed relatively insignificant. Just as perspective had far-reaching consequences that no one at the time could have imagined, it's very likely that developments in quantum physics will also create more significant changes than we can currently imagine. We all know today that a painting presents only two dimensions, the physical universe is three dimensional. But 500 years ago no one really understood that. Paintings and drawings were two dimensional. They were flat and linear without the illusory appearance of depth. The discovery of perspective, or the third dimension, profoundly changed the way people saw themselves, the universe, their place in it and the way they made art. The addition of the third dimension, the change in the perception of space, was of

great significance. The result of this was that flat, linear art was replaced by paintings, drawings and architecture that exploited a third dimension. Today we may be on the brink of a similar new era of perception. The shift in the Renaissance was due to the invention of perspective. Today, this new shift originates from the revolution in physics started by Einstein and continued by Bohr, Planck and others.

Quantum uncertainty

In 1900 German physicist Max Planck put forward a hypothesis that light and all wave elements were discharged in packets or 'quanta'. In the same direct line of development came the work of Werner Heisenberg, who in 1927 explored the idea that in order to predict the future velocity or position of a particle or wave, you have to measure its present position and speed accurately. Essentially, Heisenberg found that in the act of measurement the device used for measuring was incorporated into the object being measured. Heisenberg demonstrated that the uncertainty in the position of the particle, times the uncertainty of the speed, times the mass of the particle can never be less than a specific amount. This amount is known as Planck's constant.

The Heisenberg Uncertainty principle established that the behavior of the universe is fundamentally random. In other words, Quantum Uncertainty is a property of the world — that is it is impossible to measure the position of a particle with better precision than offered by quantum mechanics. And if you cannot be sure where an electron is or where it's going then you cannot be sure what a complex system like a human being will do. God may have created laws to control the universe but he does not control the detail. There are laws in which the universe operates but events unfold within those rules. In many ways, this model of understanding will reflect a new model for electronic art: an art of possibilities, where artists can set up an overriding framework within which things will be dynamic and empowered to move and change. One of the interpretations of quantum theory is that until a state of matter is observed, it exists in many

states simultaneously, that is, it exists as a “probability wave” that contains all of the possible states of that matter. In many ways, art is also more like a “probability wave” that is fragmented and uncertain in its position.

A new worldview: Multidimensionality

“I think the implicate order implies a multidimensional view, in that we have a vast dimensionality, a much richer sort of reality... I think in art the multidimensional order first appeared clearly with Impressionism, and then on from Cubism.”

– David Bohm

While the Renaissance was a rebirth based on the invention of perspective and the realization of three dimensions in art, I believe there is now an emerging worldview based on an understanding that the universe is multidimensional. Present-day science assumes a universe that demonstrably exists in multiple dimensions. It is not surprising that in the early days of Quantum Physics, only a few artists allowed their intuition to roam this multi-dimensional universe of space and time. Among these were Marcel Duchamp, who had perhaps the strongest artistic insight into the visions offered by quantum mechanics. Marcel Duchamp said it all in the 1930s: “The third dimension is but a shadow cast by the fourth.” Certainly his works *The Bride Stripped Bare by her Bachelors* and *Nude Descending a Staircase* anticipated many of the foresights of quantum mechanics. In this composition, Duchamp depicted motion by successive superimposed images, similar to stroboscopic motion photography. The painting shows

elements of both the Cubist and Futurist styles and the figure almost exists as a ‘wave of possibilities’. Duchamp also recognized the influence of stop-motion photography. The work created much controversy at the time and was parodied for years but in many ways it was also very prophetic.

Conclusions

Quantum theory presents a radically different view of the universe than classical science, and it is no surprise to find that many thinkers on consciousness have sought to relate consciousness to quantum theory. Marcel Duchamp suggested that the ‘normal’ world as we see it is some kind of shadow existence, like a projection on a flat surface of solid things in the real world. By amending the flawed epistemology that we inherited from the late Renaissance, which assumed a deterministic and rational universe, we can perceive this real world that is fragmented and uncertain. With the insights provided by Planck, Einstein, Heisenberg, etc, we are able to construct an epistemology which permits us to know that new ideas of space and time are legitimate aspects of the world we can see and can impact the way we think about art.

The conclusion here does not yet constitute a theory or a completely coherent system of logic. Rather, this collection of ideas and artworks is like quantum mechanics in the early 20th century, not a theory — but a collection of new and fragmented observations. My goal is to continue to build a body of work suitable for provoking an open and lively discussion of ideas to pull this intellectual sled forward. We are now entering a truly post-postmodern time and it is my opinion that art will continue to evolve towards a reflection of a multidimensional viewpoint.