

The paintings in Jeena Shin's new exhibition, *Time Crystal*, meditate on quantum systems that repeat infinite patterns of motion over time. The title derives from recent theories in quantum physics that explore 'new phases of matter' understood as an oscillating internal cycle that resists the need for external energy. In other words, a system that is no longer bound to space but rather continues to repeat differently in time in limitless configurations. Shin reflects below on the recurring internal logic of her system. Once we might have assumed a system would reach its eventual limits and reach equilibrium. The analogy of the *Time Crystal* challenges this assumption.

Writer and artist Janine Randerson¹ interviews Jeena Shin on her new series, *Time Crystal*.

Janine: The time crystal is an analogy for "a spontaneous breaking of temporal symmetry" in oscillating, endlessly repeating, the new phases of particle physics.² When did you first learn about the time crystal and what drew you to this concept in this series of paintings?

Jeena: The Time Crystal has been identified as a new phase of matter where particles repeat patterns over time without new energetic input; I first came across this idea in the *New Scientist* (2017) and again in *Nature* (2023) and in recent science documentaries. My work relates to this concept by exploring its principles through painting. The crystals are created by disrupting the spins of quantum particles, causing them to oscillate at a stable, repeating frequency. My painting practice models continuous motion and repeating patterns of motion in time. A key aspect of time crystallization is the defiance of the assumption that a system will eventually reach equilibrium or stasis. My practice reflects this idea by presenting a system that continues to repeat differently in time. It has an internal logic that is continuously generative, which is how a time crystal operates. I'm also interested in the potential future applications of the Time Crystal in quantum computing; it might revolutionise the way energy is expended in computing by the interaction of cold atoms.

Janine: How does this series extend your interest in temporal concepts from recent physics in the development of your painting system in the exhibition *Time Delay* (2022) and *Time Slice* (2019) at Two Rooms?

Jeena: Time has been important in my practice for a decade or more. The exhibition *Time Slice* highlights how our experience of time often feels disconnected from objective measurements - a feeling reflected in my paintings, where forms inherently hold the trace of the figure before and the potential next step. I found a parallel between the painted representation and the scientific understanding of time-delay, where a system's past affects the present temporal flow. Complex relationships emerge, like those observed in physics and natural phenomena. Later in the exhibition *Time delay* I examined the multifaceted nature of time. Drawing from the concept

¹ Janine Randerson is an artist, film and video maker and writer based in Tāmaki Makaurau Auckland, New Zealand. A strong thread in her research concerns art-based mediation in ecological systems, in collaboration with scientists, activist citizens and Tangata whenua and Tangata Tiriti

² Yu-Hui Chen and Xiangdong Zhang, 'Realization of an inherent time crystal in a dissipative many-body system.' *Nature*, vol. 14, no. 6161, 2023.

of time delay in physics, I referenced the Shapiro effect, where signals are delayed by gravitational fields, and I applied this to natural phenomena and human perception. I go through a process of generating countless variations from a single fold model, allowing forms to evolve without predetermination, much like the non-linearity of time itself. In the paintings time is presented as a continuous, interconnected flow where past, present and future coexist.

Janine: The time crystal has motion without energy input, where even in a low-energy state, it keeps evolving and changing. As an analogy, in our current political climate, and perhaps in your past experiences, there may be stasis or a lack of change. Yet at the same time, perhaps we are not motionless; we are building relationships between us and strengthening internal relationships that can bring about systemic change?

A parallel is drawn, in this series, between the concept of a time crystal and our current political climate. When I think about states of equilibrium versus non-equilibrium, from physical systems to societal conditions, I see the current global landscape in a state of flux. Geopolitical instability, economic worries, and the escalating climate crisis all lead to a sense of fragmentation and pessimism about the future. In a state of equilibrium, things don't change over time, while non-equilibrium implies a state that is constantly changing. The quiet acts of human connection, defiance, underlying currents of resistance and collective action are a means to navigate these challenges and uphold human dignity. My personal experience of growing up in the 1980s in Korea was a time of mass media censorship and authoritarian rule. This parallels the contemporary political climate and the ongoing struggle for political freedom. The perceived stasis of waiting for change is linked to our fears about the future and the state of democracy, and the feeling of being stuck in a low-energy state.

The time crystal analogy captures this tension between a macroscopic feeling of stagnation and microscopic persistence or resistance. Internal movement implies an ongoing, subtle but powerful evolution, much like the time crystal analogy of motion without explicit energy input in a low-energy state. When we defy executive orders, call for collective strength, understanding and compassion, we may have a means by which to face these pervasive geopolitical uncertainties.

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