

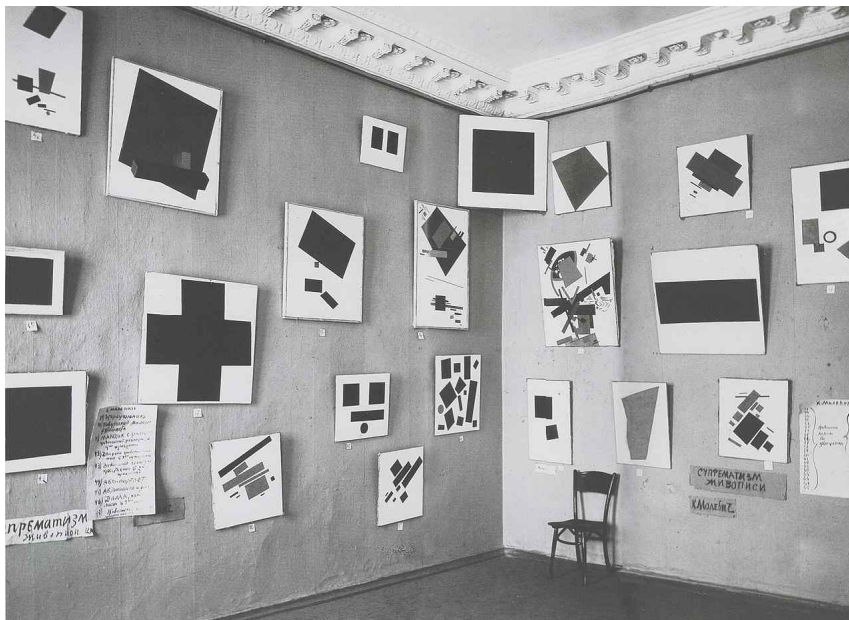
A Critical Examination Modern Physics (2022)

By. Yang Jiyeon (Director of Alternative Space Loop)

Introduction

The history of painters inserting three-dimensional objects onto flat surfaces is also art history. In the case of Western art history, perspective Filippo Brunelleschi used during the Italian Renaissance around 1410 can be a starting point, and Kazimir Malevich's *Black Square*, introduced at the *The Last Futurist Exhibition 0,10* in December 1915, can be another starting point. It is because perspective in Western painting became the most basic tool for making paintings through the 19th century Realist paintings, and Malevich's practice became the first work to leave realism and experiment with the aesthetic significance of geometric forms.

Afterwards, attempts to move beyond the major premise the painter brought, of 'including three-dimensional objects in flat paintings,' were repeated. Generating images based on specific rules, and not vaguely connecting the giant concepts of science and art, becomes proper art practice. In the case of Cheolwon Chang, the artist continues his own artistic practice transcending this against a background of research based on mathematics and physics. The reason his practice is interesting is because he honestly includes his concerns at each stage of the research, thus allowing one to find that his works are 'improving.'



The Last Futurist Exhibition 0,10, 1915, Petrograd, installation view

Meeting with Physicists

08. DUNE Site Visit

Date: Feb. 15, 2018

Venue: Building 887

The European Organization for Nuclear Research (CERN) is currently producing the DUNE neutrino detector prototype in collaboration with America's Fermilab. DUNE stands for Deep Underground Neutrino Experiment and is a project to detect neutrinos launched at Fermilab in the United States in mid-western America's South Dakota. CERN is producing a smaller version of the neutrino detector that will be made later, and it is still very large as a cubic space 12 meters by 12 meters by 12 meters in dimension, despite being a smaller type. The physicist Stefania Bordoni says this experiment will aid our understanding of how the early universe evolved and why the world is made of matter and is not antimatter. As they were fortunately not yet operating this detector during my visit, I was able to peer inside, and this golden space that was to be filled with argon liquid and gas was very regular and repetitive in its formal structure. This detector, an empty space slated to gaze upon many things later, reminded me of the concept of 'spatiality without objects' Merleau-Ponty presented.

- from the CERN report, by Cheolwon Chang

The artist's experience of participating in a residency at CERN for a month beginning in February 2018 becomes an occasion to change his art-making direction. Founded in 1954, CERN is the world's largest particle physics research center and is located in Geneva, and it is an institution studying new possibilities of modern energy physics, which detected Higgs bosons using the Large Hadron Collider measuring 27 kilometers in circumference in 2013. The artist says he was trapped in classical physics thinking before coming to CERN. However, interactions with scientists such as the physicist Rolf Landua became an occasion for breaking the mold of his thinking.

While researching the world of particle physics, Cheolwon Chang discovered that what he had considered basic common knowledge was misaligned. The artist says, "A single particle simultaneously exists in several places, and the separate concepts of space and time combine into space-time, and space-time is distorted by gravity. I was able to view this obscure idea clearly with my own eyes at a site of experimental science." This becomes the artist's own artistic interpretation of the paradox Newtonian physics had.

Although Newton described all movement while assuming an absolute coordinate system, this contradicted the law of universal gravitation, his own discovery. Modern physics commences as Einstein later discusses the special theory of relativity arguing that absolute coordinates are impossible and everything is relative. Max Planck publishing the quantum theory, asserting that energy has nonsuccessive, and not successive, value, is the point where classical physics and modern physics are distinguished.

Artistic Practice Based on Scientific Thinking

Cheolwon Chang has been continuing the practice of bringing his scientific research to his art-making method. Since CERN, his works bifurcate into those based on classical physics research and those based on modern physics research. He determines a mathematical method for generating images, and the results become art. For example, the creation process of 〈Shape Resembling a Triangle〉 assumes an absolute coordinate system and represents a virtual triangle placed in a perfect flat-surface situation. It is a piece in which the artist later referenced the triangle to create a curved figure beginning and ending at the same point and converted this onto the canvas as a colored pencil drawing.

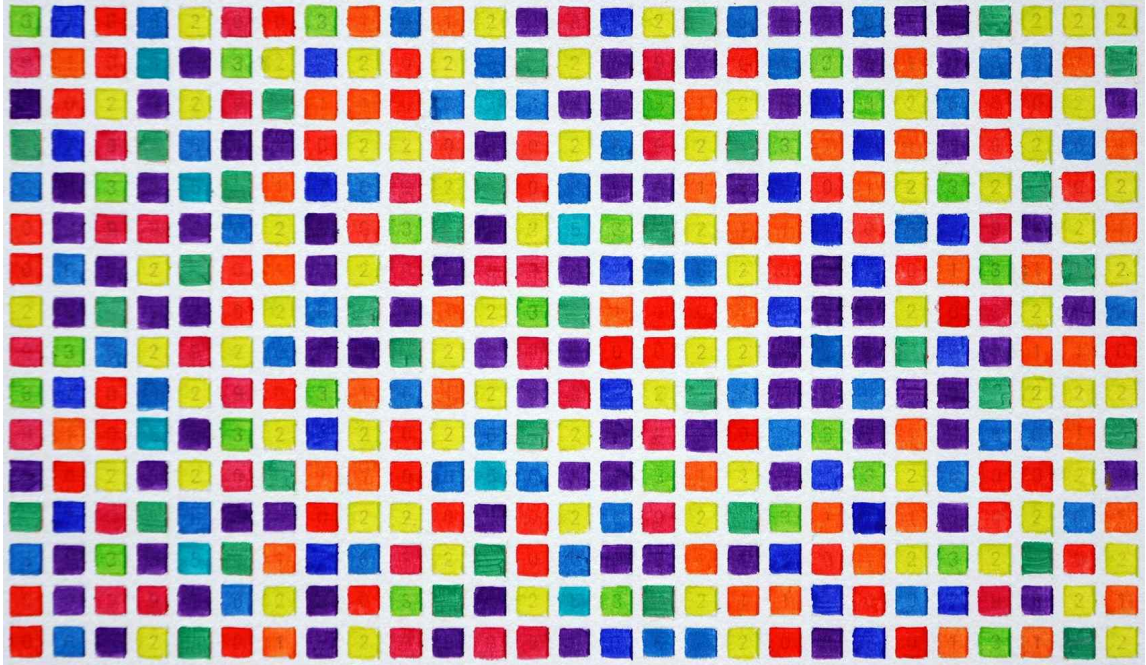
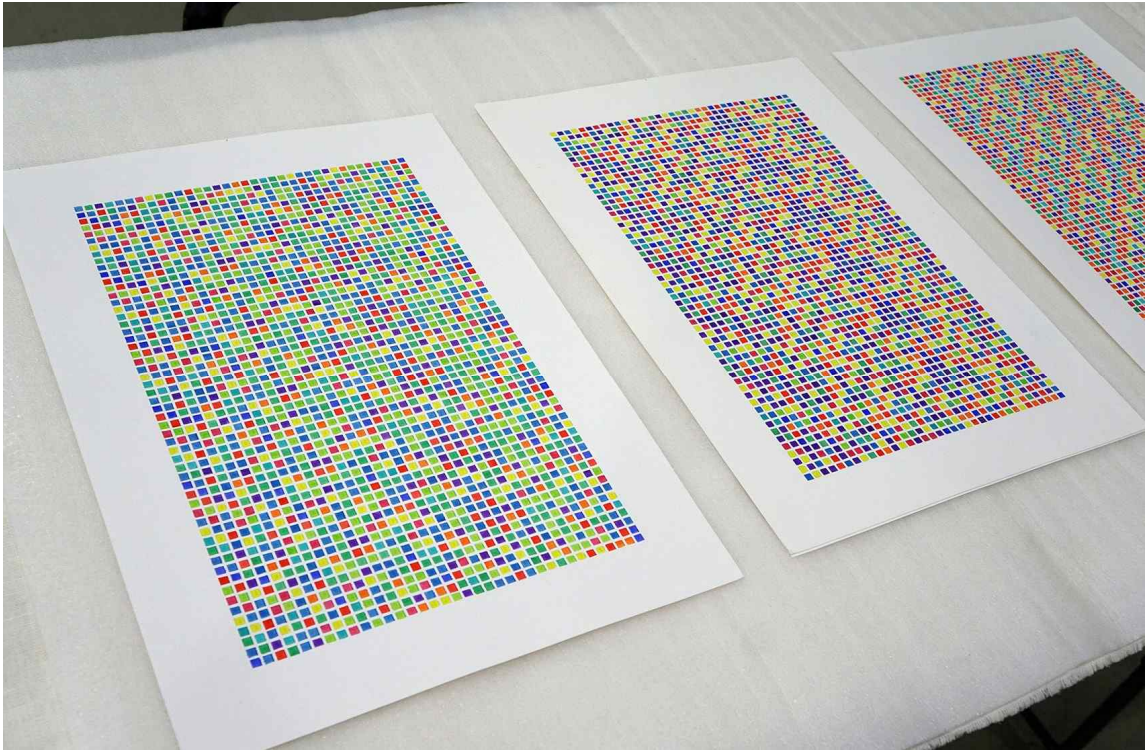
Macro and Micro 13 rotates and accumulates, while transforming the gradient, copies of a distorted triangle created based on 〈Shape Resembling a Triangle〉. The artist paints the entire canvas with gouache before drawing with a colored pencil. He presents in his work the process of new images being infinitely generated when triangles existing in absolute coordinates are repeatedly overlapped at different angles.

Cheolwon Chang describes the creation method of Sestina as follows.

- ① The artist makes an Excel table with 36 columns and 56 rows.
- ② The artist enters a series of numbers in this table, and the rules are as follows.
 - a. The number in the first row is the 36 digits below the decimal point of pi.
 - b. The numbers in the second to 56th rows are the first row's number reordered, and Arnaut Daniel's sestina rule is applied here.
 - c. The sestina rule is a spiral arrangement. For example, let us say the numbers 1, 2, 3, 4, 5, and 6 are enumerated. The ends of this number are 1 and 6. If one begins with the 6 at the back and applies the arrangement directed from the outside to the inside, they will have 615243. If they rearranged 615243, it becomes 364125. If one continues to repeat this, they will eventually get back to the first row's 123456.
- ③ One can find a certain pattern forming if they apply the sestina rule to an irregular pi.
- ④ The artist lightly prints the Excel table on paper to turn the pattern into a visual image.
- ⑤ The artist substitutes 10 pigments for the 10 numbers printed in the rectangles and paints with a flat brush as if to fill.
- ⑥ The picture is completed once a total of 2,016 spaces (36×56) are filled with color.
- ⑦ The Sestina series can be represented as an infinite series based on the infinite numbers of pi.

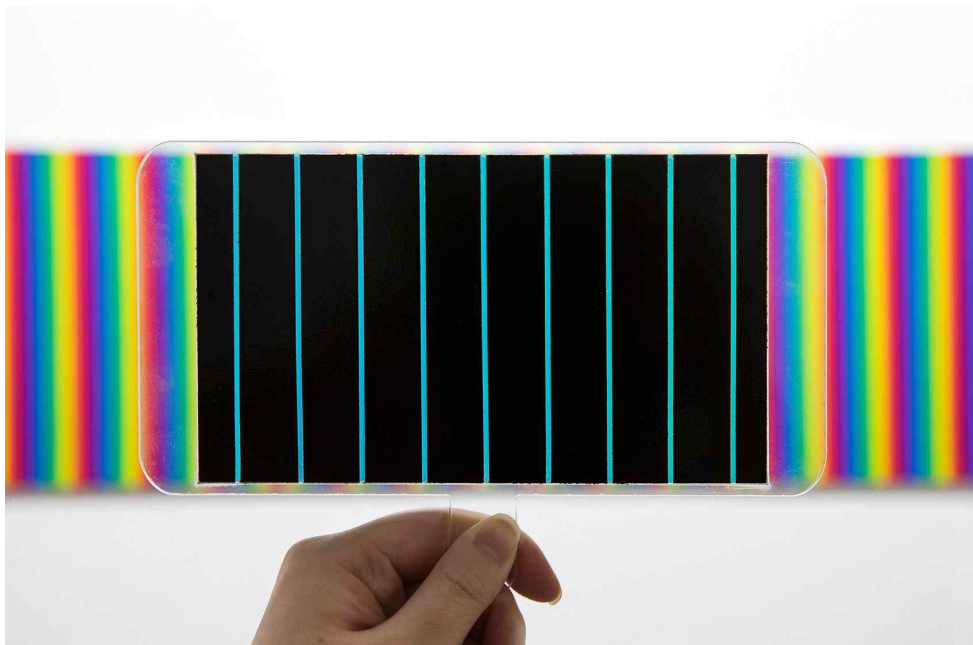
<Sestina> is a piece visually experimenting with a poetic form developed by the Occitan-speaking troubadour Arnaut Daniel of 12th century Provence, France. He conceived the sestina, a song in the form of six stanzas consisting of six lines. It basically consists of the 'tornado' and the 'envoi'. Tornado is Occitan for 'rotating' or 'twisted', and envoi means 'sending' in French. This has the structure of the end words of the six lines being rearranged in the following six lines according to the 123456 cycle, but with the same end words repeating in all of the stanzas. This special arrangement Daniel suggested later inspired poets and mathematicians alike, and he sang to develop variation.

Using the sestina rule, Cheolwon Chang completes an image by hand-filling 2,016 identically sized rectangles with colors. He created 16 paintings so far, and he reveals these can be created infinitely. Cheolwon Chang in 21st century Korea experimented on paper with a visual structure the mathematical, linguistic, and sound structure that was experimented with in 12th century France. The result appears like a colorful Morse code with a cheerful sense of rhythm.



Cheolwon Chang, <Sestina> 2020. gouache on paper, 42.0x29.7cm (above) / detail (below)

If the artist personally experimented with the qualities of dots, lines, and planes in geometry and created the art in the aforementioned works, there is a series of works in which viewers experience the properties of light and color. 〈Splitting the Rainbow (2018)〉 is a piece in which viewers directly participate in the color composing rule and each viewer creates different colors. A rainbow-colored canvas is hung on the gallery wall, and viewers see the picture in the canvas using a rectangular sheet of acrylic in the shape of a smartphone. It is a piece leading viewers to see monochromes like green and blue, and not the entire rainbow colors, through the segmented sections in the acrylic sheet. In fact, we have no way of comparing regarding the greens each of us sees. It is because we cannot scientifically prove the green I see versus the green you see. Cheolwon Chang's 〈Splitting the Rainbow〉 recommends to the viewers a visual experience in which one is inevitably subjective by using a simple visual device.



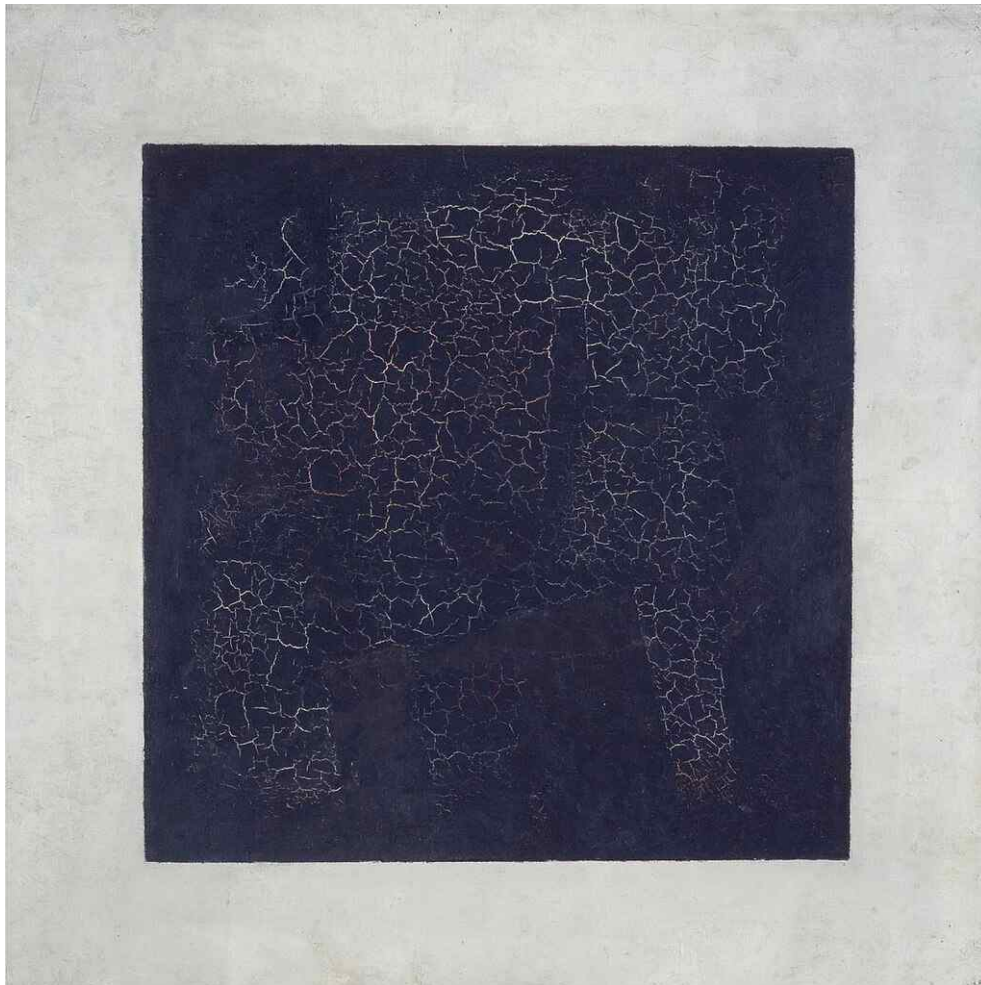
Cheolwon Chang, 〈Splitting the Rainbow〉 2018. acrylic sheet & acrylic on canvas, dimension variable

The Case of Malevich

Malevich's 〈Black Rectangle〉 was first exhibited in 〈The Last Futurist Exhibition 0,10〉 in December 1915. It is a piece in which the artist painted a single black rectangle on a white square canvas, the painting surface. In the exhibition catalog, 〈From Cubism and Futurism to Absolutism〉, he calls Absolutism 'the new painterly realism' and builds his own philosophy, Suprematism, on the aesthetic significance of geometric forms. The poet Vladimir Mayakovsky publishes the 'Absolutist Manifesto',

and it begins as follows. “By Absolutism, I argue that pure appreciation is absolute in art.” He claims to have eliminated colors and shapes, painting’s basic elements, in order to do away with the obsession with imitation painting has held so far. “At some stage, Absolutism is a pure philosophical cognitive movement through colors, and it is a movement as shapes at the second stage, and these shapes can become practical if they form a new style of Absolutist decoration.”

In 1917, following two Russian revolutions, avant-garde art was seeking change as a left-wing movement under the motto “We will abandon the old world and build a new one.” However, Stalin began using Socialist Realism for a kind of state propaganda after coming to power in 1924, Paving Malevich’s claim of exploring avant-garde aesthetics transcending bourgeois tastes, his works were criticized for infusing an anti-revolutionary spirit while following bourgeois tastes. This ironically presents the process of an avant-garde art practice inclined toward ‘pure’ geometric abstraction being misread by the political structure of society at the time.



Kazimir Malevich, 〈Black Square〉 1915. oil on linen canvas, 79.5×79.5cm
Tretyakov Gallery, Moscow

Conclusion

Three typical elements related to art's representation traditionally exist in art historical discussions. The object, the object's actual image, and the image as a mental picture. The image as a mental picture holds a unique status while being compared to art as a mental product. It is because the image as a mental picture becomes a representation that subjectively intervened between a certain object and the object's actual image.

As John Berger said in *Ways of Seeing*, the image is a visual object that was recreated or reproduced. He says, "The way people view an image when it is presented as a work of art is influenced by a few concepts premised to be educated in relation to art and culturally important." His images realize the way he views the world. Cheolwon Chang's art practice exists on a certain moment of modern physics, and it functions in a specific place where he interacts with a contemporary audience.