



MULTIVERSE

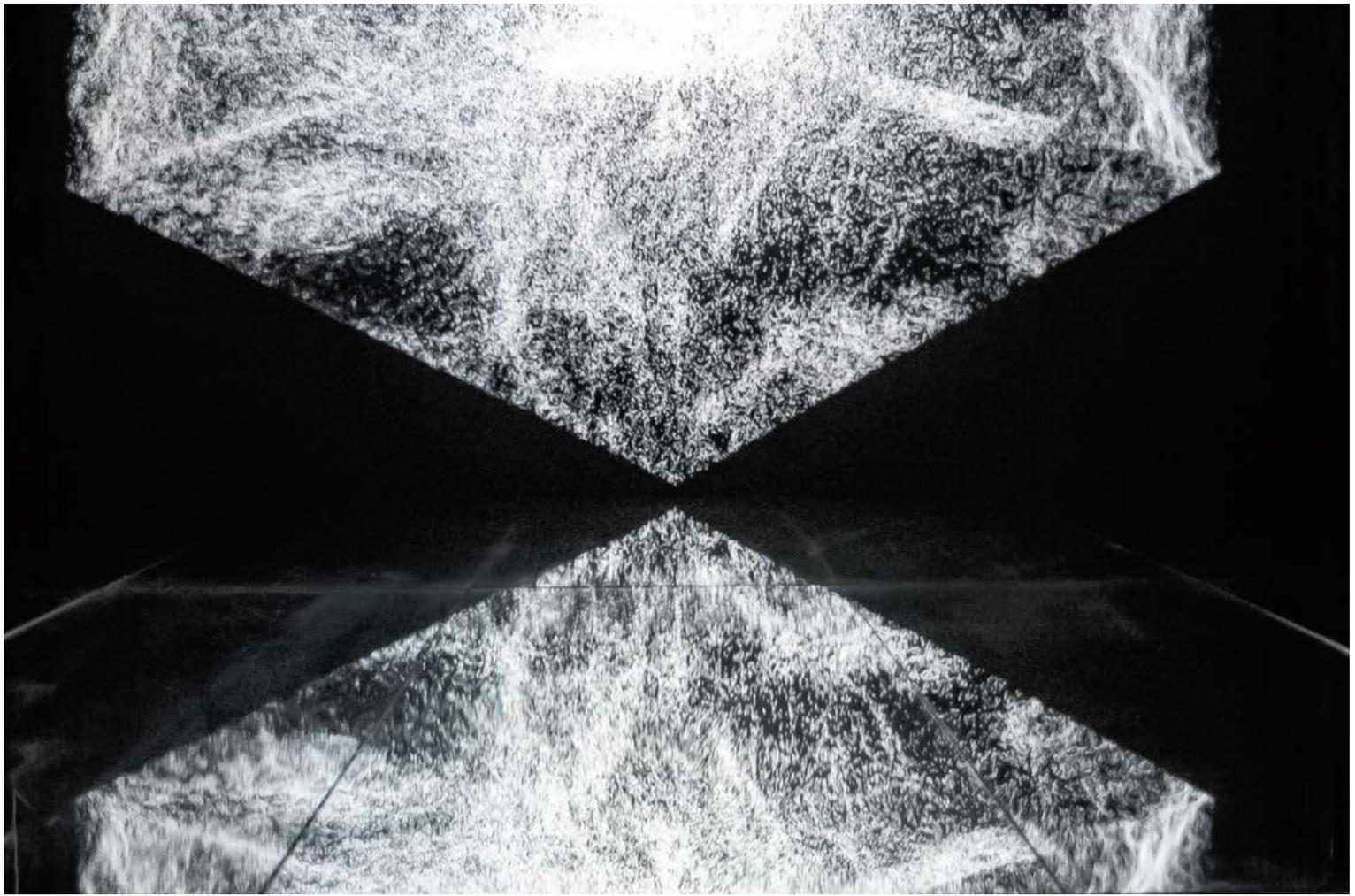


Fig.1 Multiverse.artwork detail

fuse* is a studio and a production company founded in 2007 that operates at the intersection between art and science, with the aim of exploring the expressive potential offered by the creative use of emerging digital technologies.

Ever since the outset, the studio's research has focused primarily on the production of installations and live-media performances capable of profound audience engagement amplifying the emotional impact of the narration.

Over the course of the years, the studio has evolved, thereby allowing for an ever more holistic approach to the creation of new projects. Adopting a *modus operandi* which valorizes pure experimentation, the goal is to create works that inspire people, push back the limits and seek out new interplay between light, space, sound, and movement. **fuse*** has always linked its activity and development to that of the community in which it operates, supporting, promoting and developing projects aimed at spreading culture and knowledge. For this purpose, it co-produces NODE since 2016, an electronic music and digital arts festival.

CONTACTS:

*FUSE*FACTORY*

c/o FUSE srl

Via Nuova 9,

41011 Campogalliano (MO)

Italy

[*info@fusefactory.it*](mailto:info@fusefactory.it)

[*http://fuseworks.it/*](http://fuseworks.it/)

Trailer [*https://vimeo.com/205071534*](https://vimeo.com/205071534)



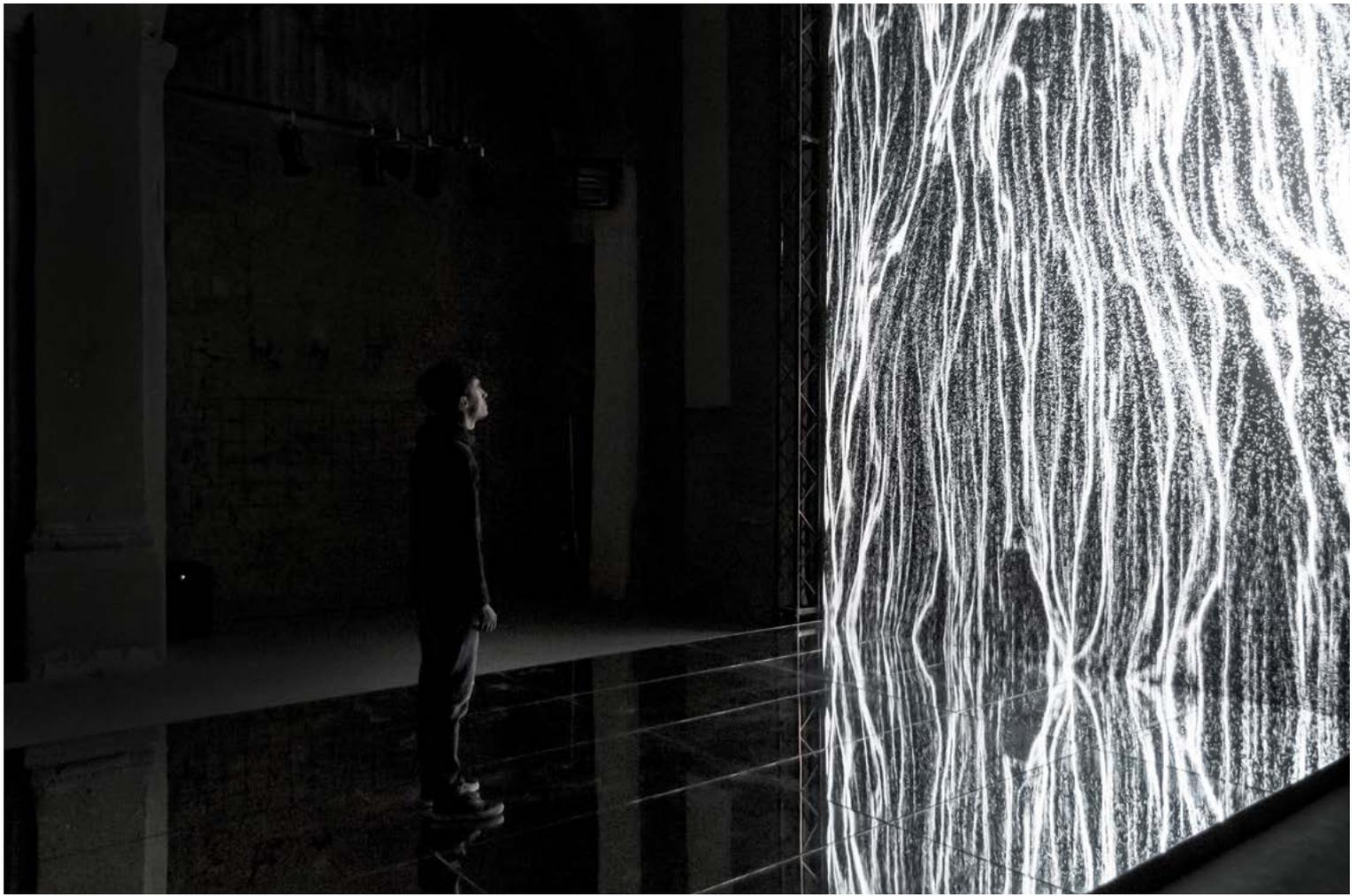


Fig.2 Multiverse Stream.

The feeling of being suspended, unstable, takes away security as the idea that our universe and our very existence is the result of chance and a random combination of events and information.

Intro

Multiverse is an audiovisual installation created by fuse* that explores the evolution of infinite possible universes through the use of generative graphics and sounds that exploit the theorization of the existence of the so-called multiverse: a system composed of an infinite number of universes that coexist parallel outside our space-time.

The installation lays its foundations precisely on this concept and, through the creation of a succession of digital paintings generated in real time, attempts to represent the eternal birth and death of infinite parallel universes.



Fig.3 Stream.

Concept

The multiverse theory of Lee Smolin, an American theoretical physicist, helped us to create a scientifically coherent narrative context. According to this theory our universe is only one in a much larger cosmos (the Multiverse), a member of a growing community of universes, each one being born from the collapse following the formation of a black hole. During this event, the values of certain parameters of the physical laws are reprogrammed and slightly modified. This process leads to a revolutionary image of a Multiverse where universes with more black holes have more descendants. Smolin concludes that because of this “Cosmological Natural Selection” our universe is in this particular configuration and was born following precisely this mechanism; the existence of the earth and of ourselves, therefore, is partly causal, but at the same time the result of an infinite evolution of other universes. Hospitality to life in our universe is seen as a consequence of a self-organized process.

Multiverse aims to create a relationship of great intimacy with the viewer while wanting to keep the hierarchies between the two main characters. On one side the ephemeral and vulnerable human figure and on the other side something extremely vast and incomprehensible, almost impenetrable, such as the universe.

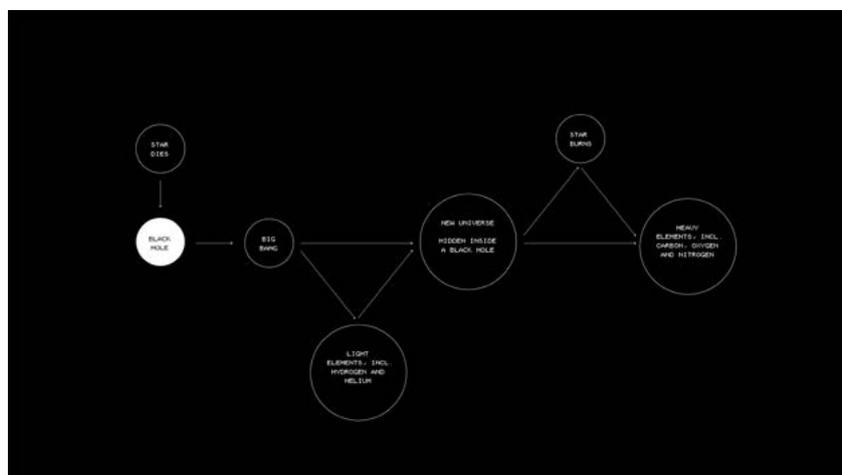


Fig.4 Lee Smolin Theory of “Cosmological Natural Selection” explains how universes self replicate within black holes. The same universes that create black holes, favored by natural selection, also create the potential for life.

Making of

MULTIVERSE GENERATION

In Multiverse, the role of “creator” belongs to the software, an application developed in openFrameworks that manages the generation of the various scenes that are displayed and that interacts with Ableton Live and Max/MSP for the production of the soundtrack through a generative sound system. Each digital picture represents a stage in the evolutionary path of a multiverse which evolves through a series of key passages theorized by Smolin. In particular, we started from the assumption that the gravitational collapse of matter does not end in a singularity of a black hole but that it gives life to a so-called child-universe. While the physical laws of simulation remain the same every time these events occur, there are small random changes of the values of the parameters of physical laws during the bounce leading to the origin of a new universe that has slight differences in its fundamental properties.

The particle simulations that are shown to the viewer are born through the creation of an ad-hoc simulated environment that allowed us to experiment with different motion rules and the relationship with the digital environment. Particularly, the particles react with each other and with the surrounding space, changing the information perceived by modifying a vector field that stores the values within a voxel space. The strategy involved the massive use of shader programs that maximize the hardware performance and optimize the graphics pipeline on the GPU.

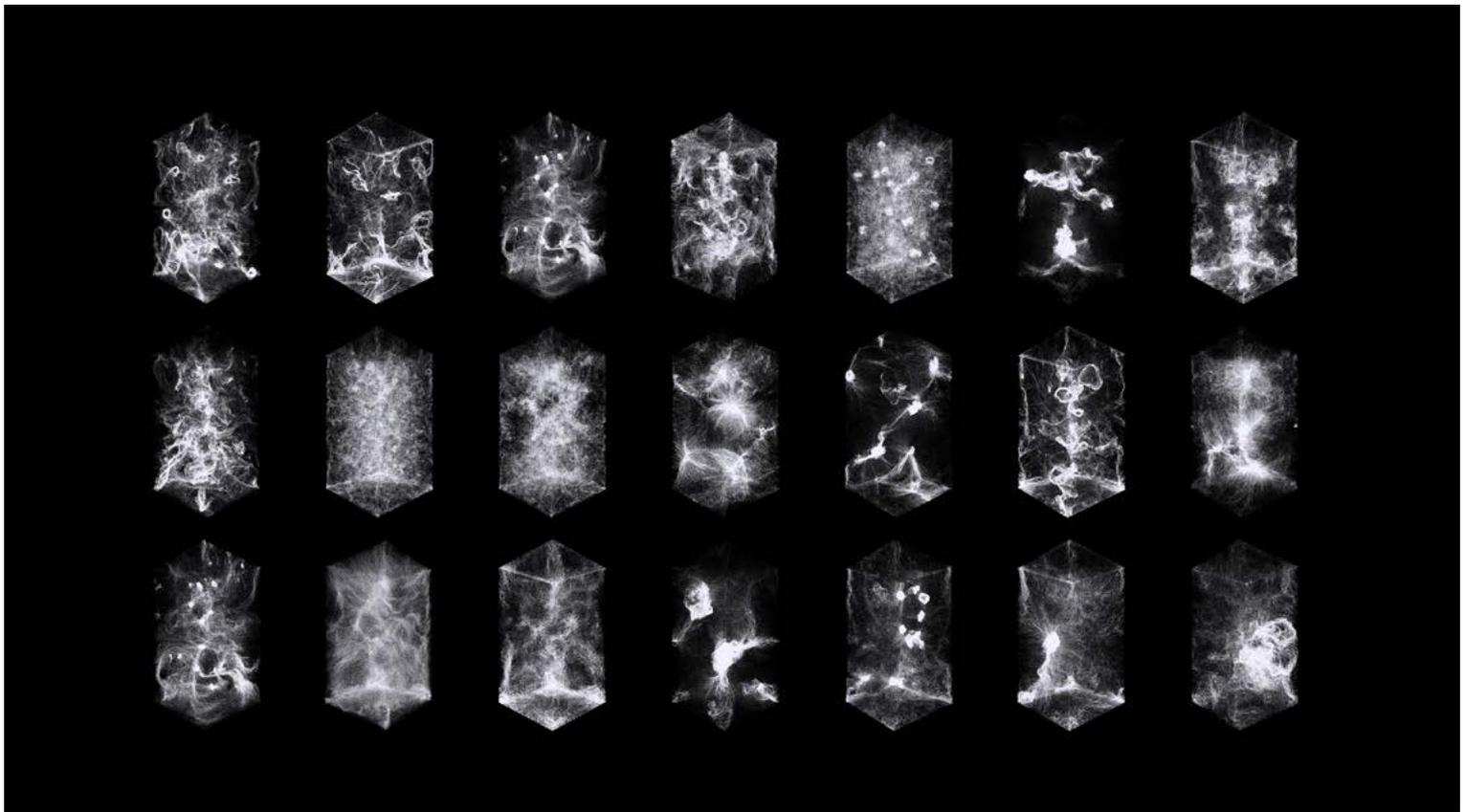


Fig.5 This picture depicts a series of the infinite variations coming out of the software. Every time the simulation starts a few key parameters change their value leading to a different final configuration.

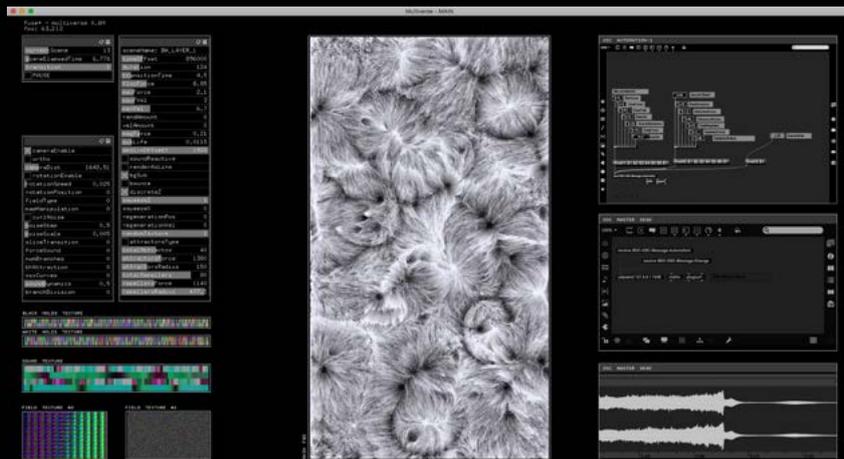
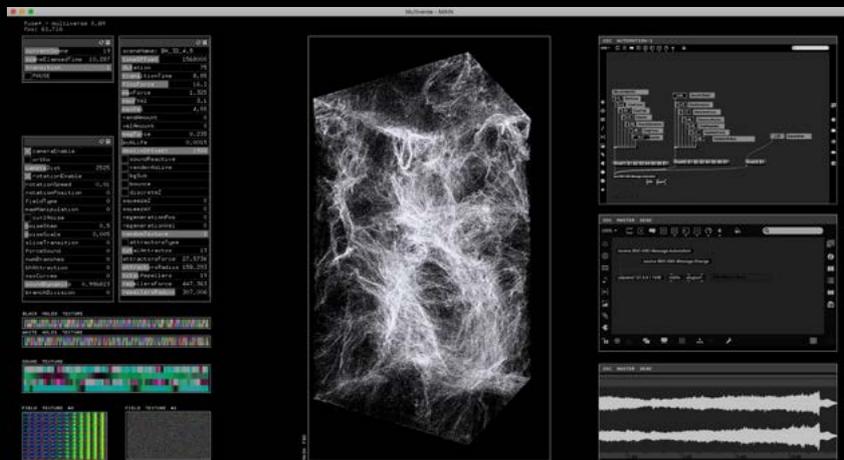
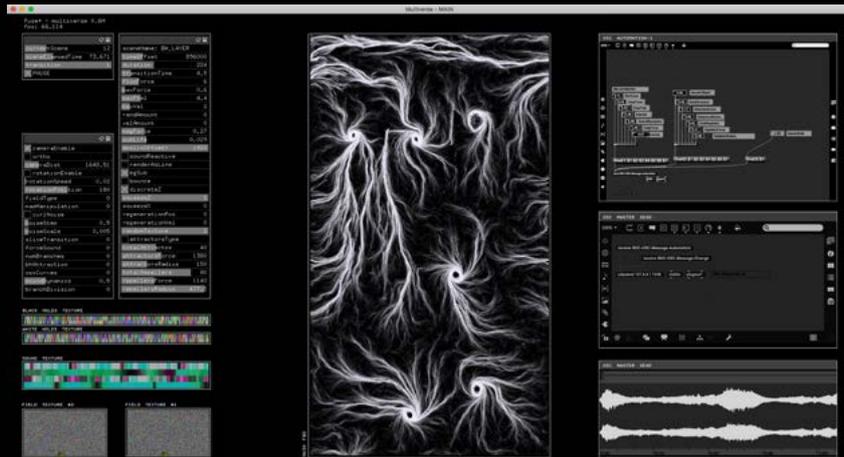


Fig.6-7-8 Interface of the openFrameworks application.

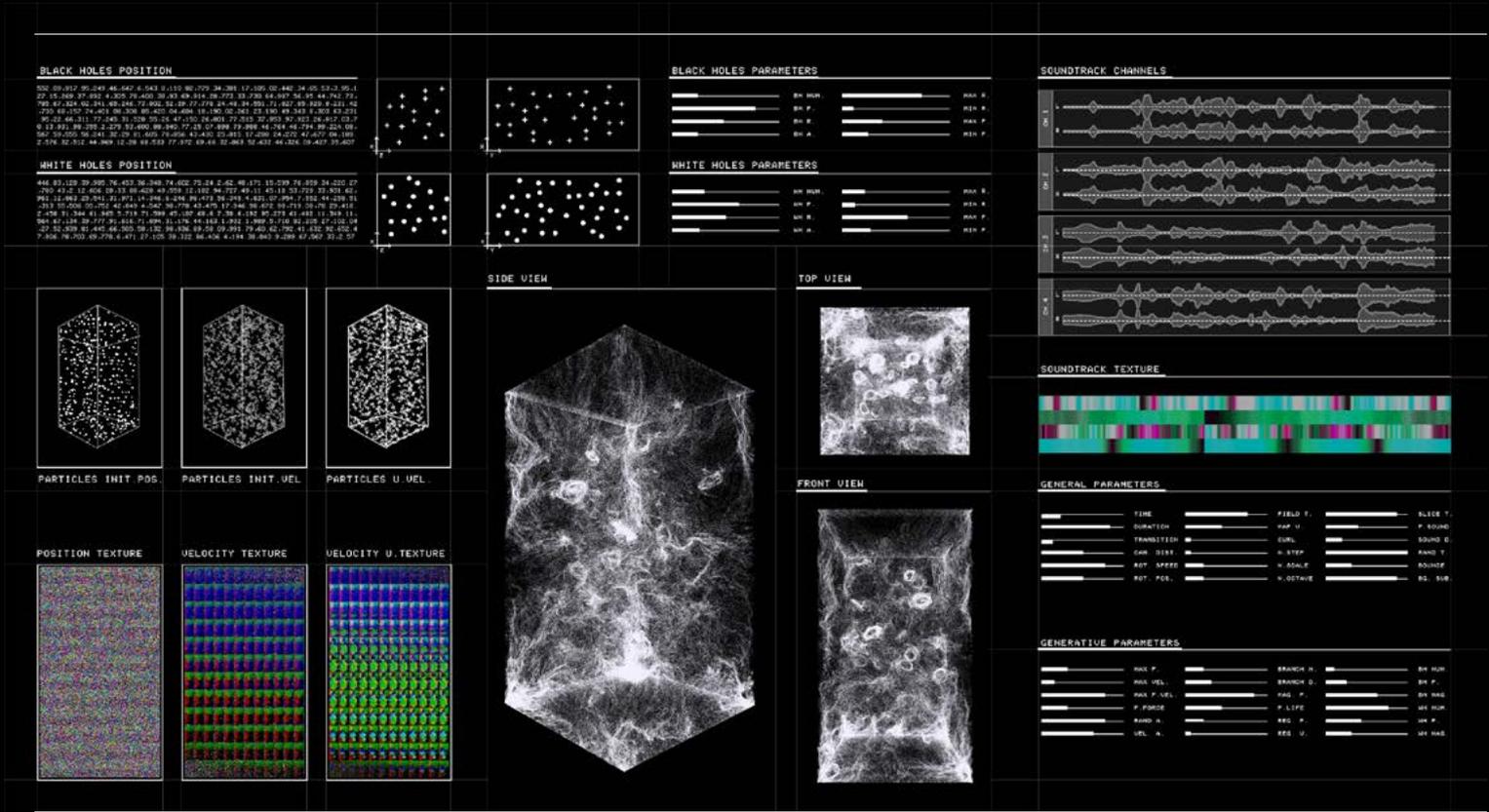


Fig. 9 Informative board of the generative process.

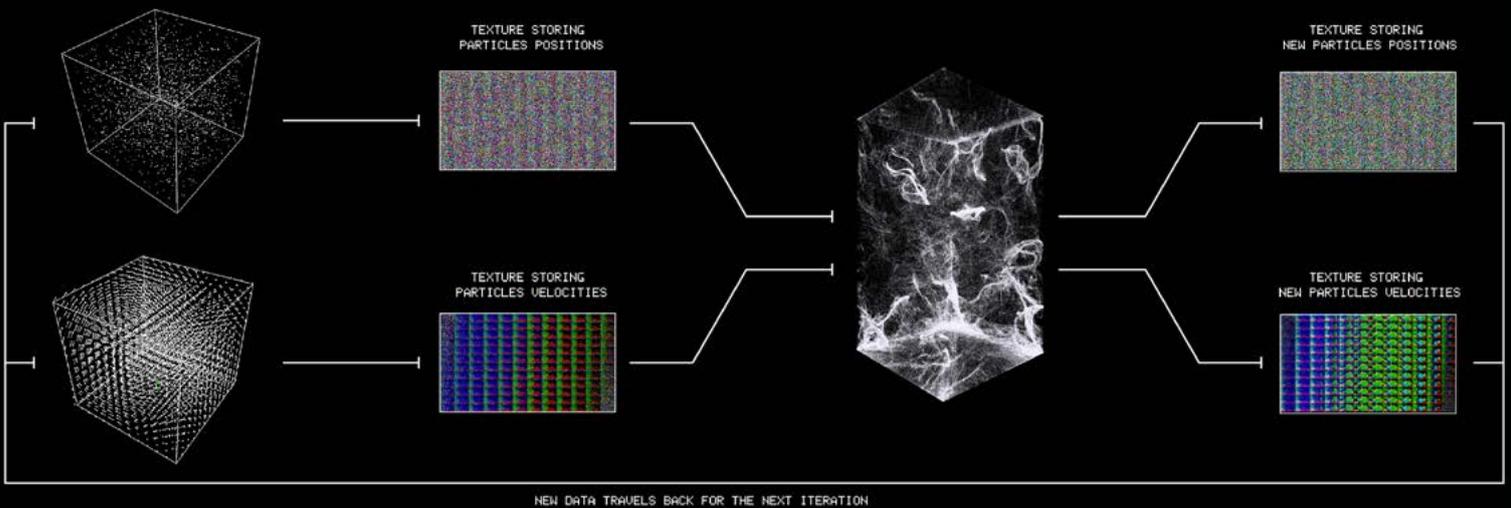


Fig. 10 This scheme outlines the strategy used to store and modify particles position and velocity. We used textures as variables for shader programs that are able to read the information collected inside the image, perform calculations and then write back new information inside the texture element.

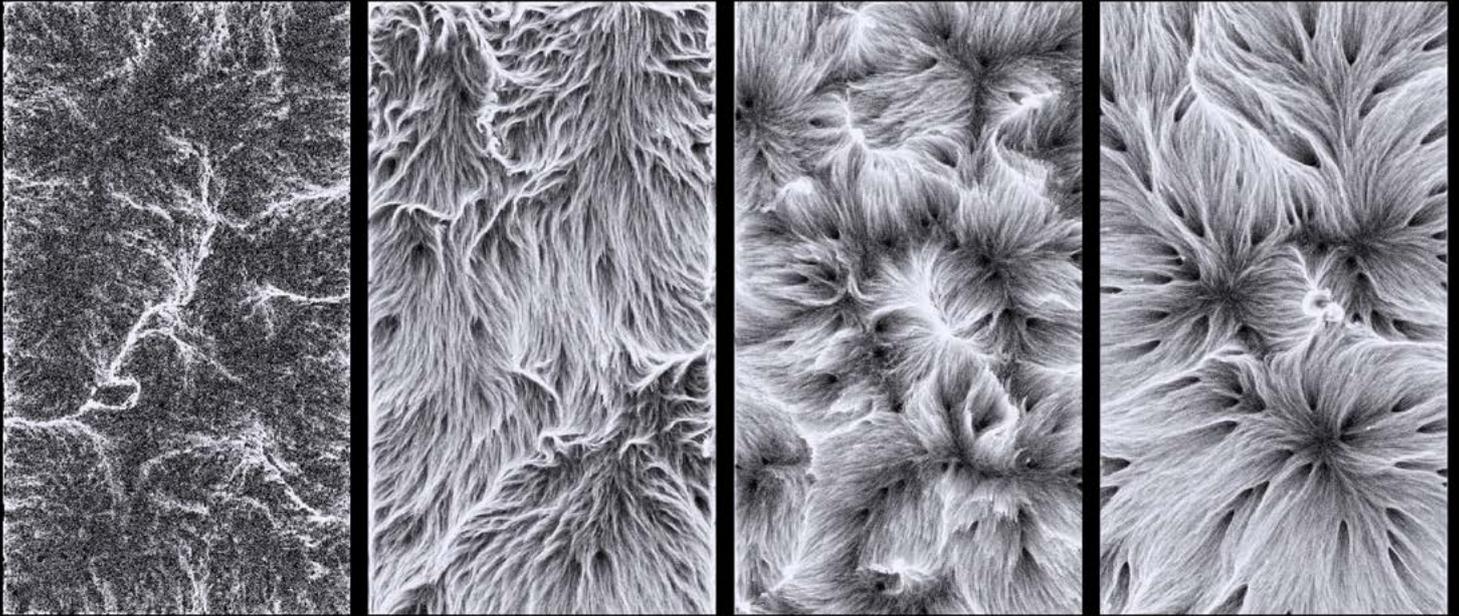


Fig.11 Universe Plate evolution.

COSMOLOGICAL PATTERNS

While the installation shows a generative character through its whole unfolding we defined a series of stages through which the narration has to undergo.

The digital artworks created using realistic simulation as a ground for experiment and take inspiration from speculative theories about the evolution of our universe and life in our current space-time scenario.

Each scene, however, does not repeat itself in the same form. After thirty minutes the previous sequence of steps carrying the genetic information of the last passage triggers an evolutionary transition and the exploration of new possibilities through the modification of the so-called fundamental parameters. The generative nature of the system allows the creation of infinite variations that cyclically follow one another during the life of the artwork.

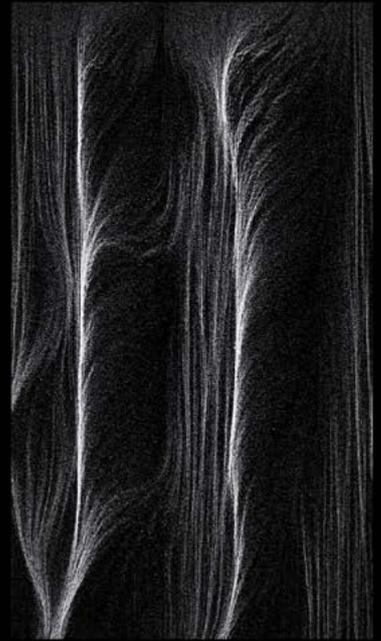
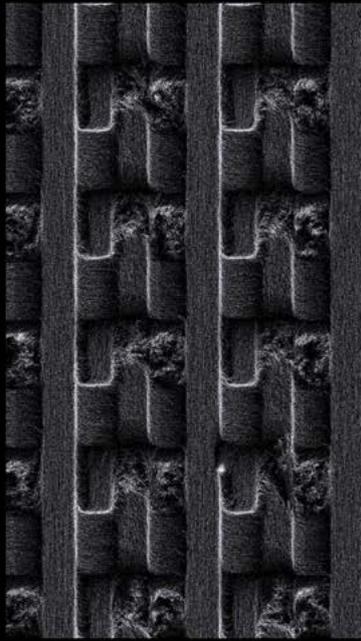
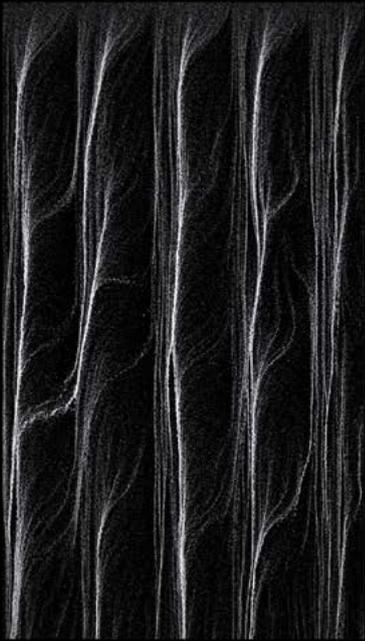
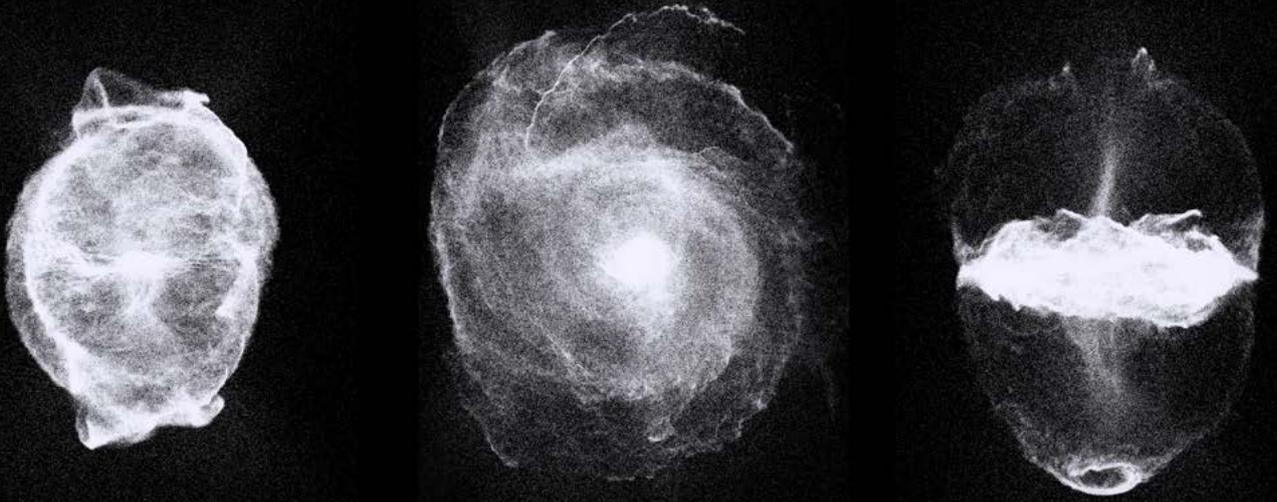


Fig.12 -13 Details from Black Hole 3D(top) and Stream scene(bottom).

Fig.14 Stream.



SET UP

The installation consists of a vertical projection of 7.5 meters high and two large mirroring surfaces that generate an infinite reflection of the image towards the sky and the center of the earth. The goal is to increase the perception of reality by giving the impression that the installation is going beyond the physical walls projecting itself into a boundless space.

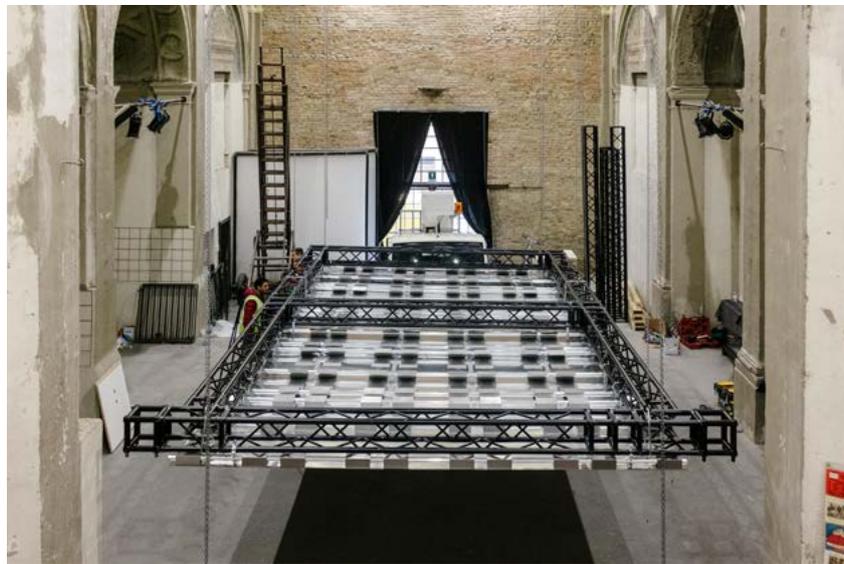


Fig.15-16 Setup phase.

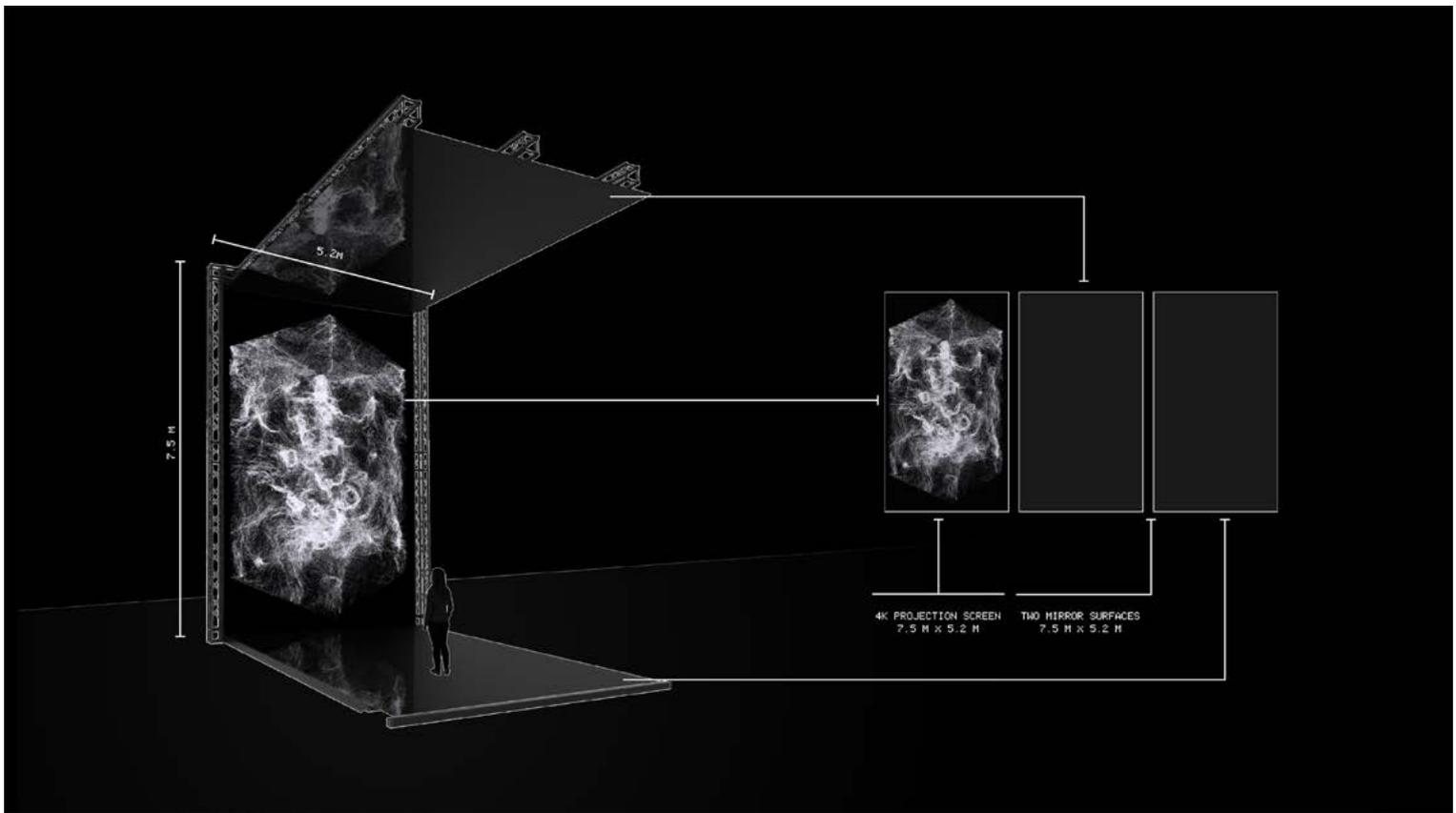
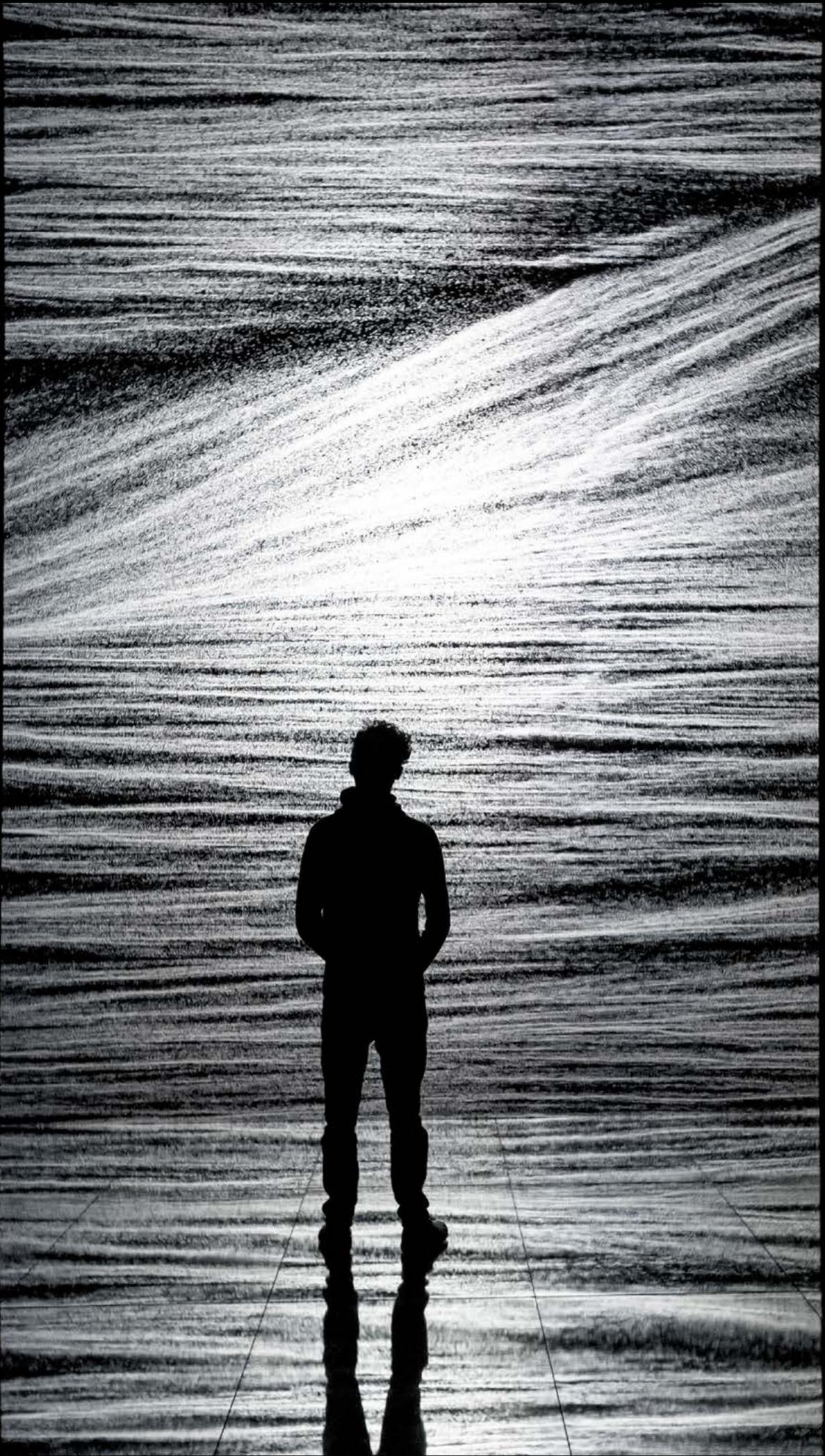


Fig.17 Multiverse structure composed by two large mirroring surfaces and a 4K rear projection screen.

The work has been staged for the first time in BDC28, a deconsecrated church in the historic center of Parma. For this first staging, it was used a 4K rear projection and two modular structures both as a flooring and on top. The lower surface has been designed to be walkable, thus allowing free access for the public. People can, therefore, be completely immersed in the work, within a projection that infinitely rebounds in front of their eyes.

Borgo delle Colonne 28 is the BDC headquarter, a center dedicated to contemporary art founded by Lucia Bonanni and Mauro Del Rio that played a significant role in the project by co-producing the installation.







Credits

Production: fuse*, BDC – Bonanni Del Rio Catalog

Art Direction, Executive Production: Mattia Carretti, Luca Camellini

Concept: Mattia Carretti, Luca Camellini, Samuel Pietri, Riccardo Bazzoni

Software: Luca Camellini, Samuel Pietri

Sound Design: Riccardo Bazzoni

Hardware Engineering: Matteo Mestucci

Setting: Fiera Srl

Video Report: Matteo Torsani

Photo Report: Emmanuele Coltellacci

MULTIVERSE is developed using openFrameworks.

Special thanks to friends, family and the whole FUSE*FACTORY crew for their support.