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# • able

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responding to the complexities  
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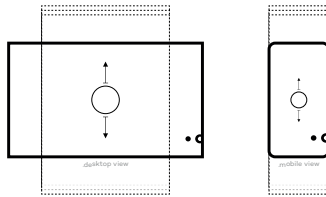
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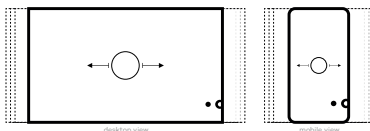
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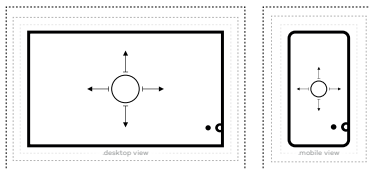
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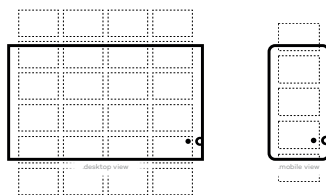
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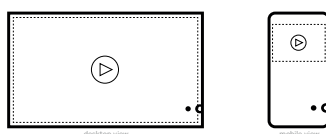
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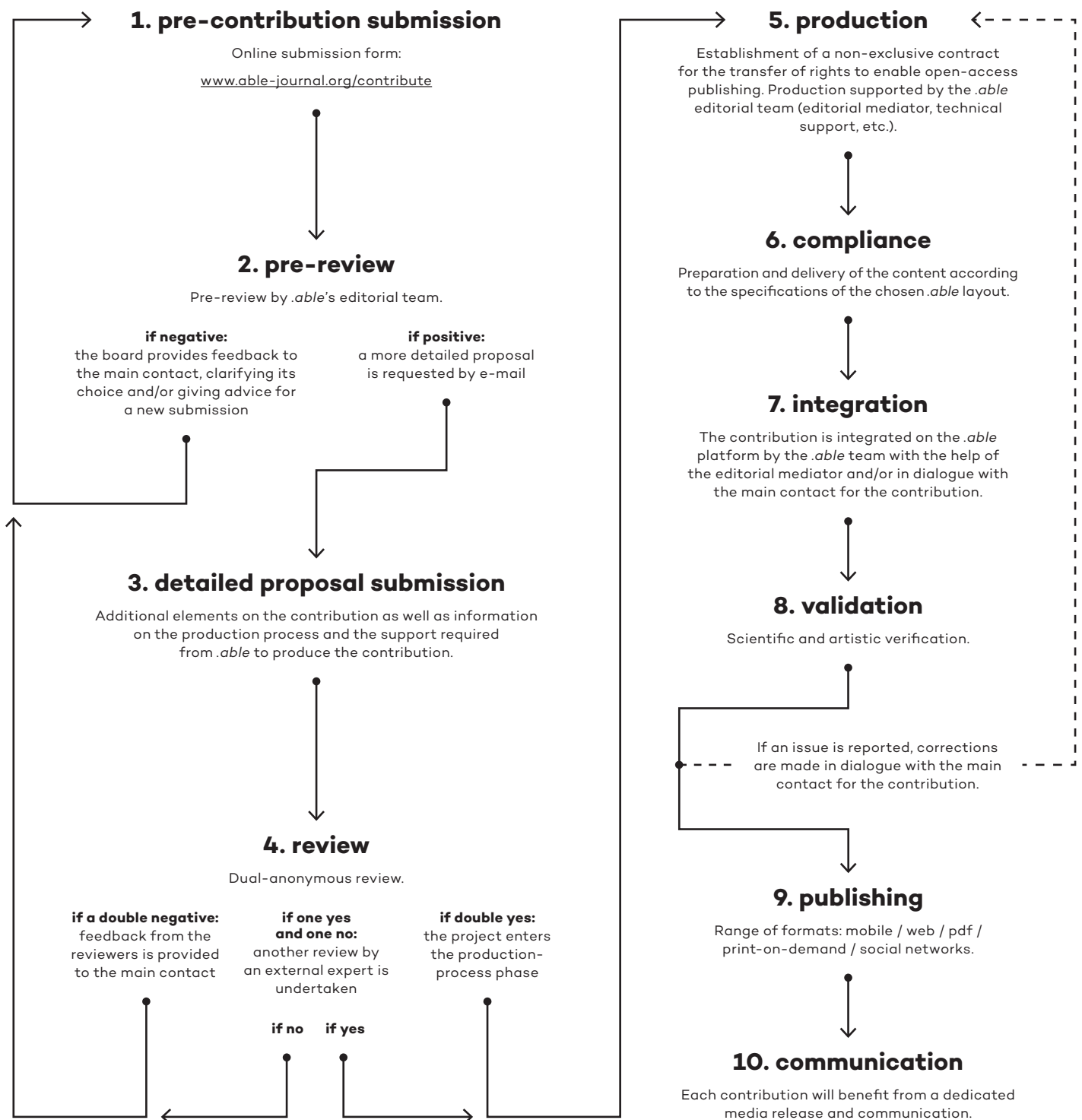
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.able offers a new publishing space for interdisciplinary research to both the academic community and the wider public. With its radical approach to publishing, the journal reinterprets the traditional publishing process.

A distributed platform designed to publish image-based academic articles resulting from practice-based research at the intersection of art, design, and science that deals with contemporary issues (environmental, socio-economic, and anthropotechnical issues to name a few).

A peer-reviewed journal, .able produces academic articles in the form of visual essays that can reach a wide audience.

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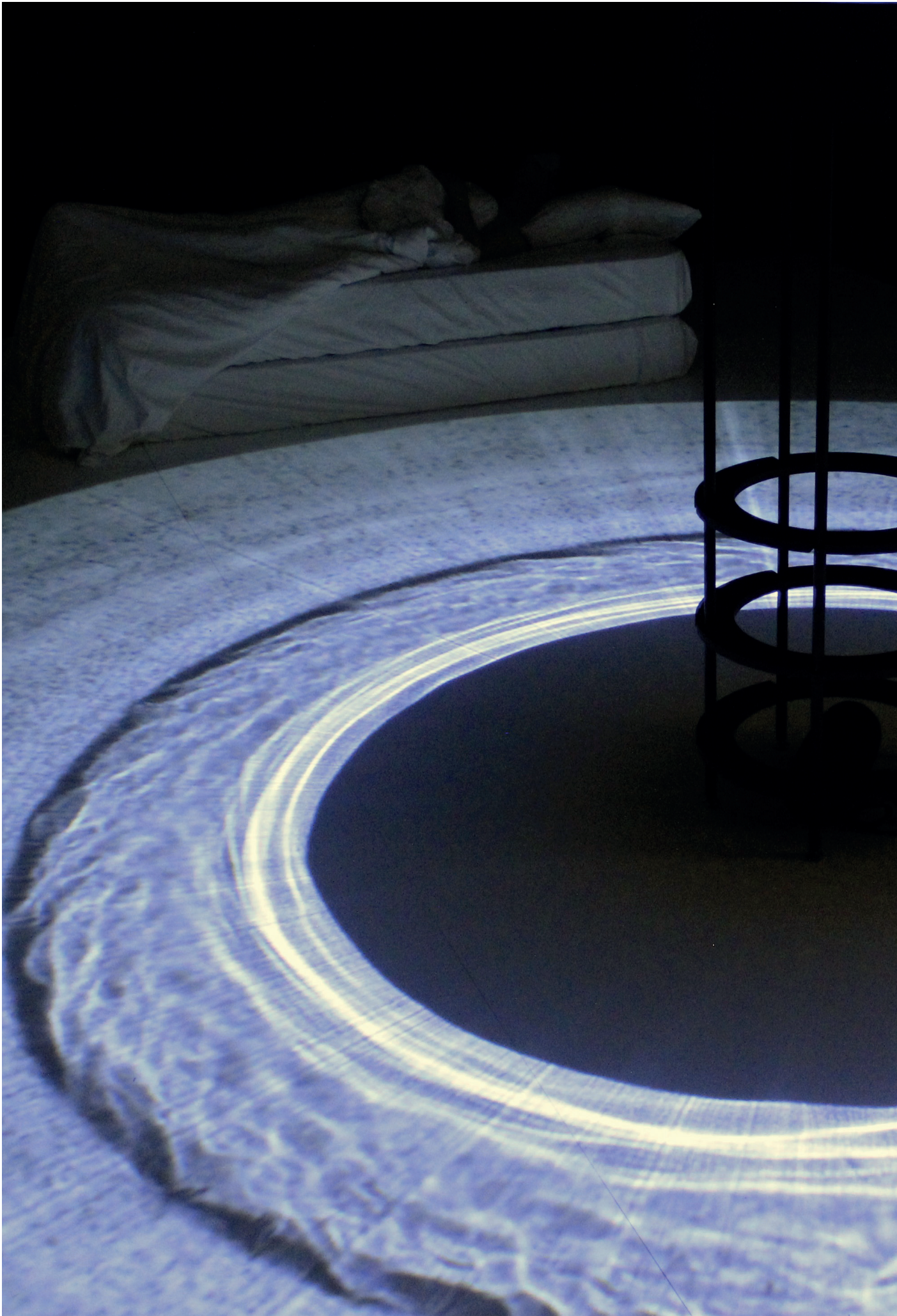
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Virgile Novarina, Walid Breidi & LABOFACTORY (Jean-Marc Chomaz, Laurent Karst)

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# rêve quantique

## *the day I imagined the ocean*

Virgine Novarina, Walid Breidi & LABOFACTORY (Jean-Marc Chomaz, Laurent Karst) – March 23, 2023

• sleep • dream • quantic • brainwaves • ocean • fluids • shadowgraphy • invisibility • imaginary

While a sleeper may seem inert, their brain is going through subconscious creative states. Nonrapid eye movement sleep in particular is associated with a lesser perception of their self and their environment. During this stage, intense exchanges occur between brain regions.

The brain is a fathomless entity involving billions of interconnected neurons exchanging electrical, chemical, and physical signals. The electronic activity is described by the Schrodinger equation of quantum mechanics for the wave function associated with the electrons shared between all the cells. The wave-particle duality applies and, depending on the measurement apparatus, electrons may be observed as a coherent wave pattern covering large regions of the brain or as particles localized on individual neurons. Thus, thoughts and dreams belong to the wave functions space, neither undulatory nor corpuscular, and any measurement corresponds to an arbitrary projection. Alpha, beta... delta waves are such observables, traditionally used to project quantic states of mind onto a predetermined representation. But what is lost or gained in such a simple abecedary?

To explore the richness of brain activity during sleep, sleep artist Virgile Novarina, in collaboration with digital artist Walid Breid, has teamed up with physicist-artist Jean-Marc Chomaz and architect-designer Laurent Karst of LABOFACTORY, who produce art installations to question our relationships with wind, waves, clouds, and oceans.

“Full fathom five thy father lies,”<sup>1</sup> the ocean, origin and close, limbo and shroud. The ocean transmits electromagnetic signals only a few meters down. Deeper data may only be collected through sound scattering or water-born measurements from ships, buoys, or gliders. The ocean is animated by streams, vortices, and waves at all scales. Water masses retain the elusive memory of the Earth’s climate at the time they left the surface and sunk deep. The associated vertical circulation is slow, one thousand years to close the loop. It is called Thermohaline Circulation, driven by heat and salt density variations.

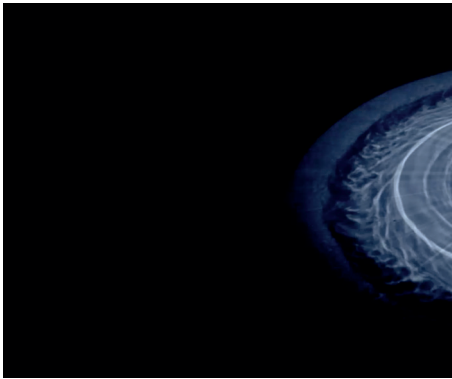
Presently, it is tempering global warming, returning the heat of the past. But its fate in the changing world is unknown. Could the oceanic circulation stops leading to the next anoxic event as in previous geological periods?

*Rêve quantique: The Day I Imagined the Ocean* is conceived as an immersive installation that creates connections between the brain and the ocean, both unfathomable. An installation that keeps the quantum idea of projection onto observables that define a system of states, similar in their semantics for ocean and brain: waves, vortexes, streams, and pulsations. What would happen if the semantics of one universe is translated into the other, in a kind of inside out automatic writing? Would the visitor entering the transcoded world feel themselves diving into the dream or falling into the ocean or would reality itself be subdued, the visitor drowned in their own unconscious?

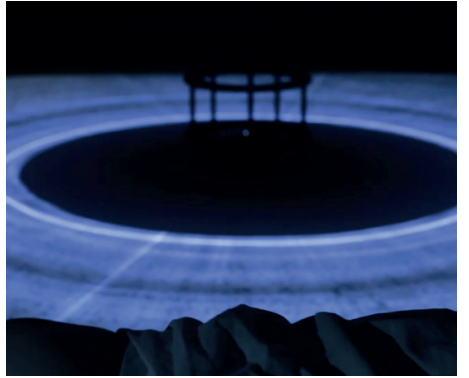
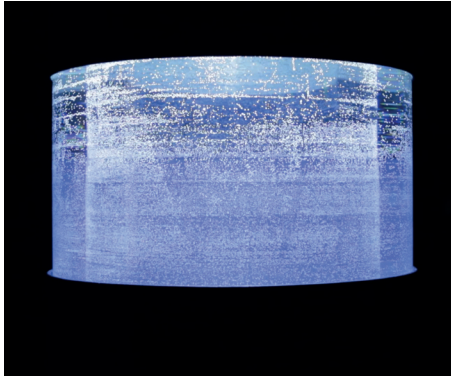
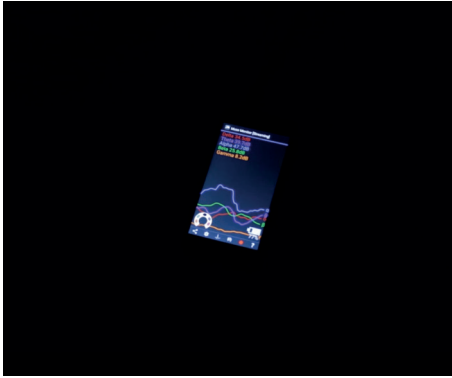
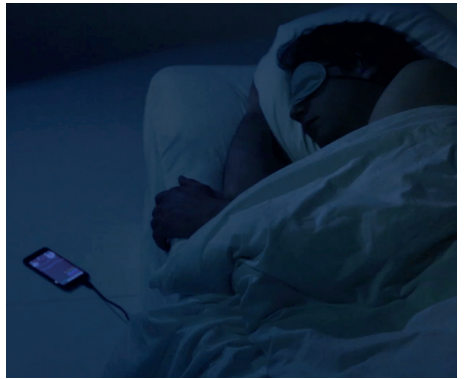
The documentary film traces the project’s genesis and the research involved. The film brings together the two unfathomable worlds, sleep and the ocean. It constitutes a visual exploration of the space opened up by the imbalance between the poetic dimensions of the project, the scientific facts and knowledge, and the human experience of shared research.

The documentary also interrogates the experience of a visitor entering the intimate space with the sleeper in his bed, close to a sort of a lighthouse that contains a miniature ocean. Getting closer, she notices the headband, the cellphone monitoring the brain waves. On the floor she observes the shadowgraphic projection of the internal oceanic movements making a bright changing circle 4 meters in diameter. What is the connection? The artists have patiently built an abecedary of delta wave states from measurements. The time series of different states forms a never-ending phrase transcoded live into a second abecedary to control a motorized device at the surface of the ocean mimicking the wind-driven entrainment. Could the visitor perceive that? Or be lost in the translation, dreaming with the ocean, flowing with the sleeper?

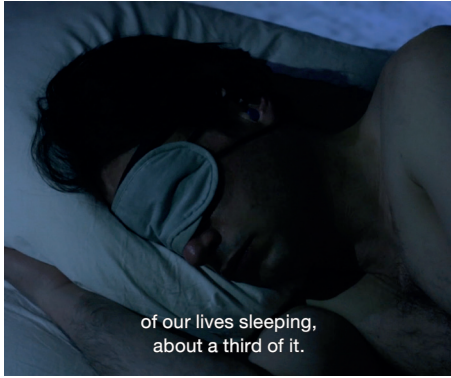
1. William Shakespeare, *The Tempest*, Act 1, Scene 2.



The day I imagined the ocean  
 deep and shallow  
 slow tide  
 bounded to no shore  
 the light folding into shadows



We spend an important part



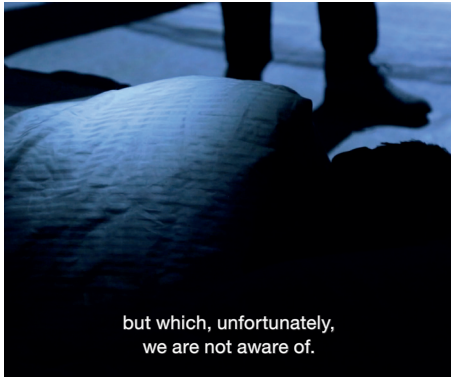
of our lives sleeping,  
 about a third of it.



When you get to remember  
 a little bit or explore



we realize that this is  
 a time when the brain is very creative



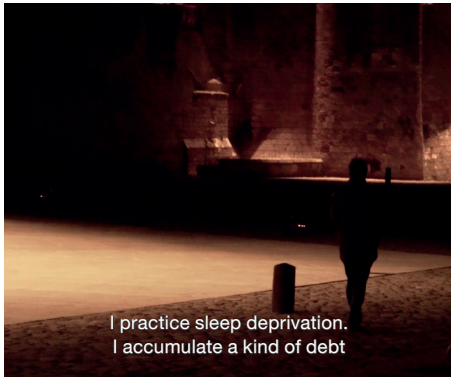
but which, unfortunately,  
 we are not aware of.



And since, on the contrary,  
 I find it a very rich moment in life,



I felt like showing it  
 and sleep in public



I practice sleep deprivation.  
 I accumulate a kind of debt



to show real sleep  
 as a result of being tired



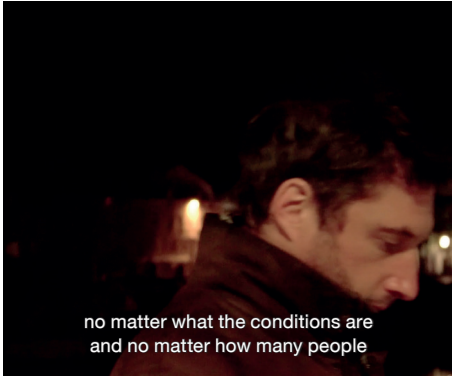
So this sleep deprivation, which is for me a conditioning process,



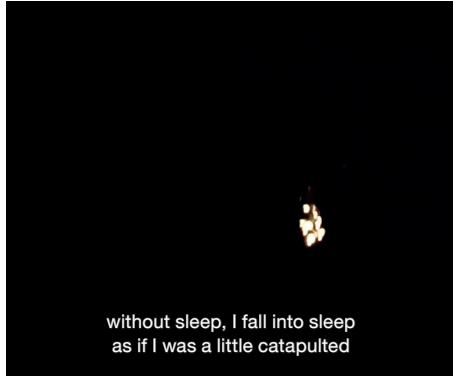
has become a kind of ritual before any performance



during which I spend in general two sleepless nights to be able to fall sleep



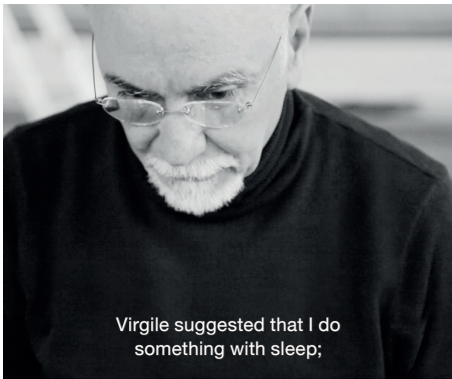
no matter what the conditions are and no matter how many people



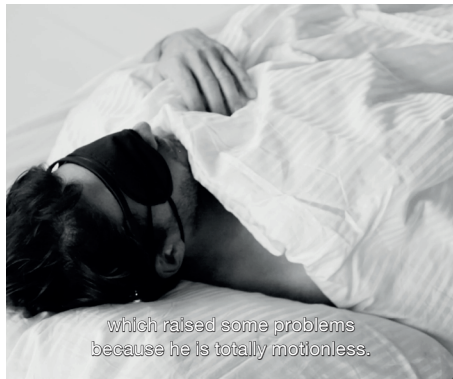
without sleep, I fall into sleep as if I was a little catapulted



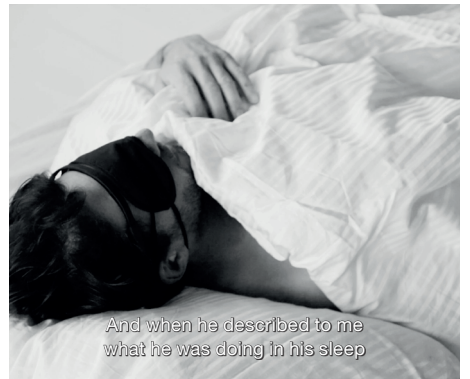
into the depths of sleep.



Virgile suggested that I do something with sleep;



which raised some problems because he is totally motionless.



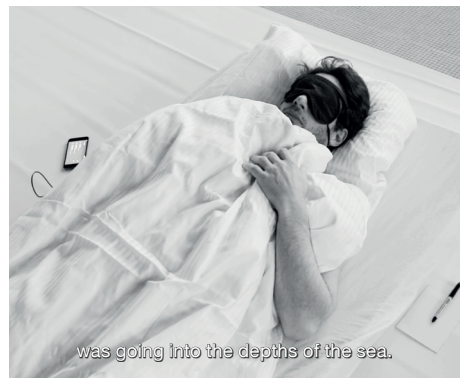
And when he described to me what he was doing in his sleep



and how he woke up to write down his thoughts at night,



I had the impression that he was a little bit like a pearl diver.



was going into the depths of the sea.



he rarely finished his sentences,



Creating an echo.



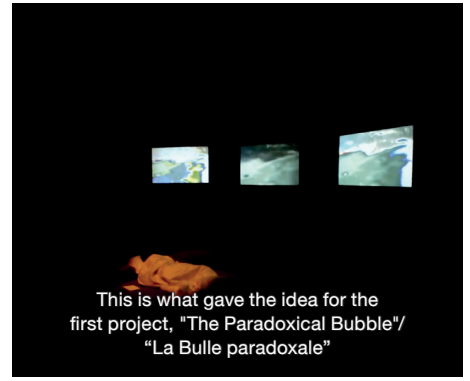
The sleeper dives into her or his sleep



and when he wakes up, maybe he has a mind full of dreams,



And when he wakes up, he forgets everything.



This is what gave the idea for the first project, "The Paradoxical Bubble"/ "La Bulle paradoxale"



two installations that involved brain waves of sleep:



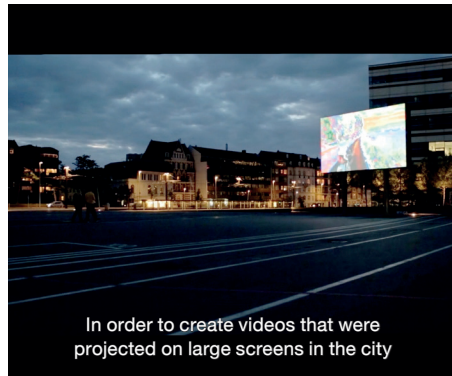
So, we connect a little bit the world of wakefulness and the world of sleep



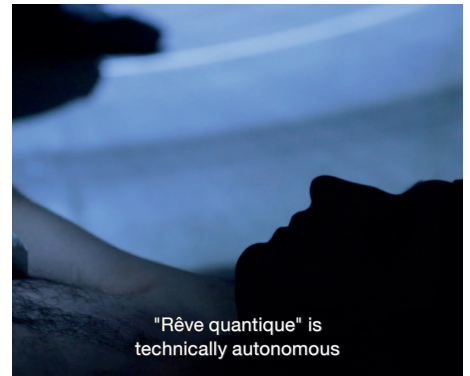
it was in Denmark, in Aarhus, it's called "Sleep in the City"



but in a collective and participatory way,



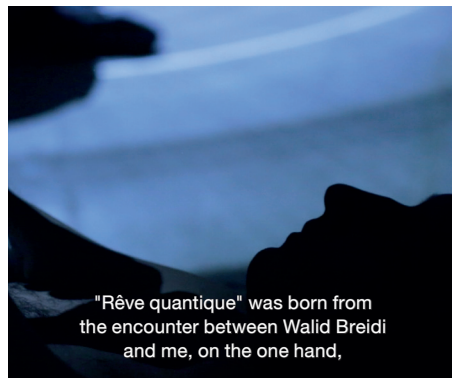
In order to create videos that were projected on large screens in the city



"Rêve quantique" is technically autonomous



because it is like a heart that beats by itself.



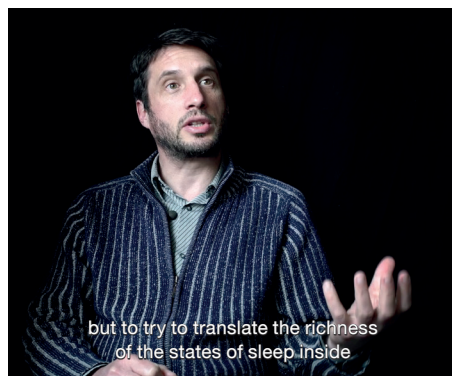
"Rêve quantique" was born from the encounter between Walid Breidi and me, on the one hand,



and between Jean-Marc Chomaz and Laurent Karst, from LaboFactory; in fact,



to finally materialize these sleep waves,



but to try to translate the richness of the states of sleep inside



And when I spoke about this with Jean-Marc Chomaz, at LadHyX (École polytechnique)



he said to me, "But there are the same type of waves in the deep ocean".



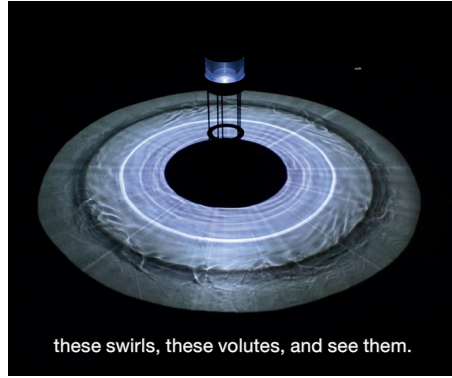
unfortunately, this is incompatible, since the deep ocean is inaccessible.



And in fact, Jean-Marc Chomaz told us that we could create a miniature ocean



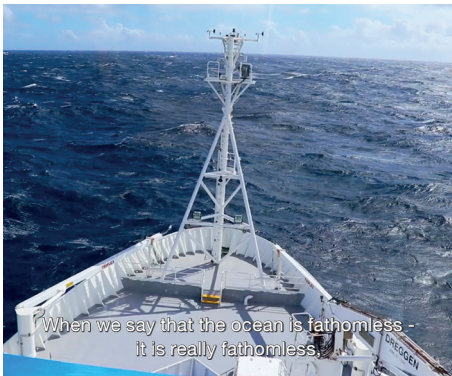
in which we could create these waves,



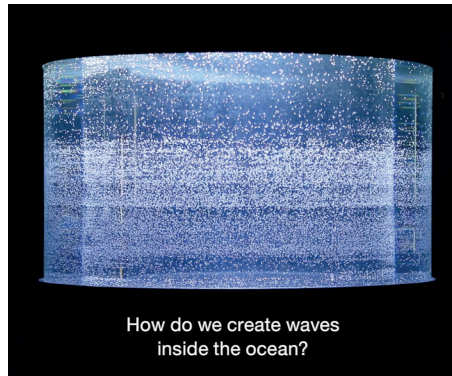
these swirls, these volutes, and see them.



the activity of Virgile's brain, not to the same kind of electronic activity



When we say that the ocean is fathomless - it is really fathomless.



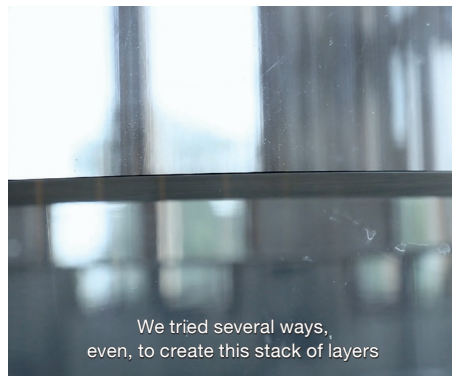
How do we create waves inside the ocean?



So, the recipe for creating a miniature ocean



and to make different densities, we put different salinity.



We tried several ways, even, to create this stack of layers



and after, it was necessary to test several ways to create movements



The ocean is not only the surface, there are all the depths too and this,



we know now that we don't know what's going on



We don't know what the dynamics are.



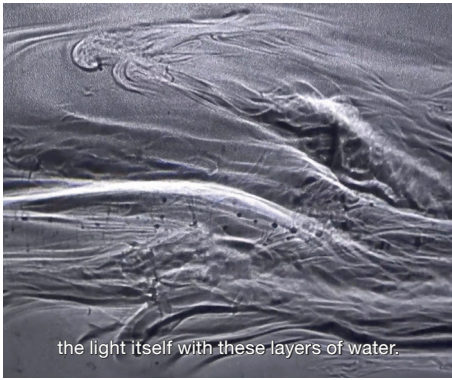
We know that the time scale is dynamic.



But these movements are invisible,



To make them visible, you have to provoke another interaction.



the light itself with these layers of water.



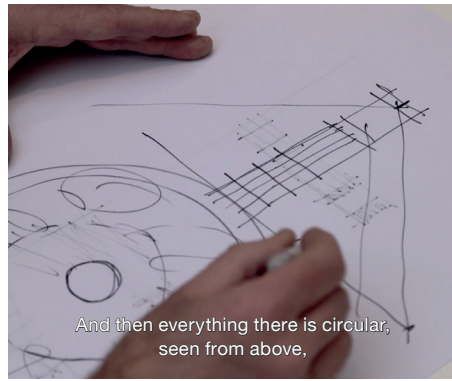
There is a cylinder, disks in the lower part, and devices.



And it is this, in fact, that will retransmit the cerebral waves.



that can tell this relationship with the ocean.



And then everything there is circular, seen from above,



Here is almost in the dark.



And there, we find even in "Rêve quantique", the idea of the shadow.



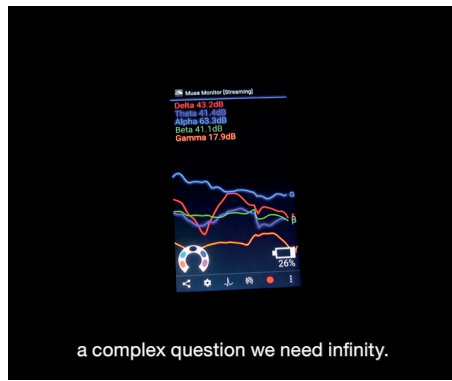
It's a space that is really inaccessible to us.



But we will be able to access this space with a projection



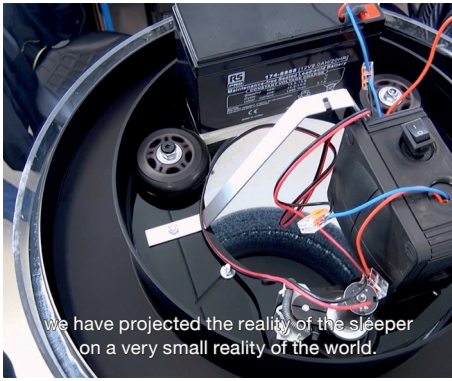
a space which is observable, measurable, with values,



a complex question we need infinity.



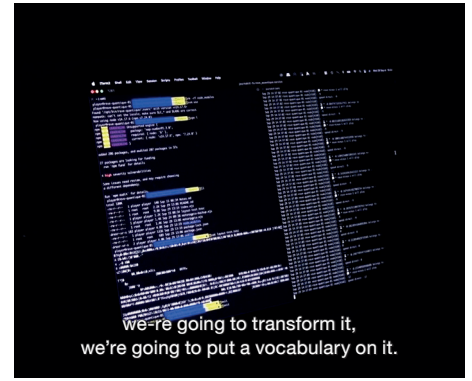
And In "Rêve quantique" we connected two infinities;



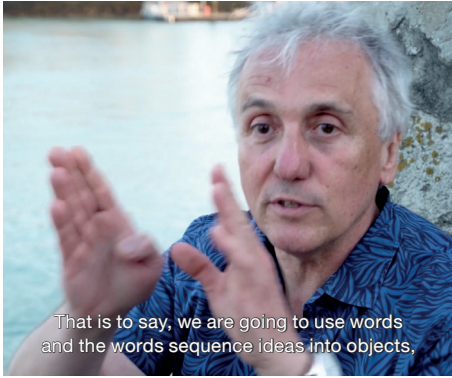
We have projected the reality of the sleeper on a very small reality of the world.



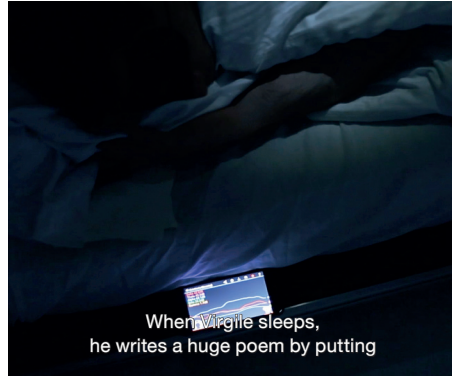
We're going to transcode this wave,



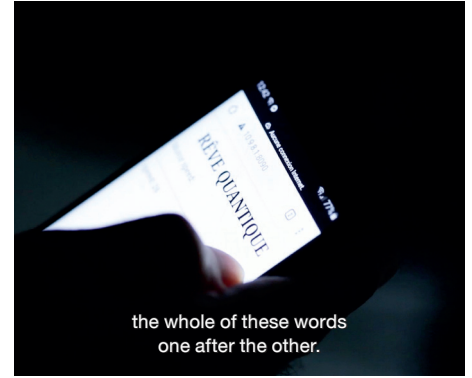
We're going to transform it, we're going to put a vocabulary on it.



That is to say, we are going to use words and the words sequence ideas into objects.



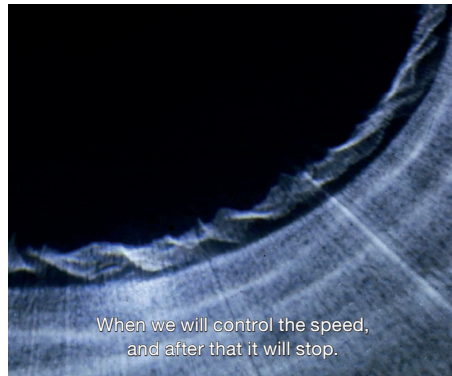
When Virgile sleeps, he writes a huge poem by putting



the whole of these words one after the other.



It's this that we will time afterwards, then.



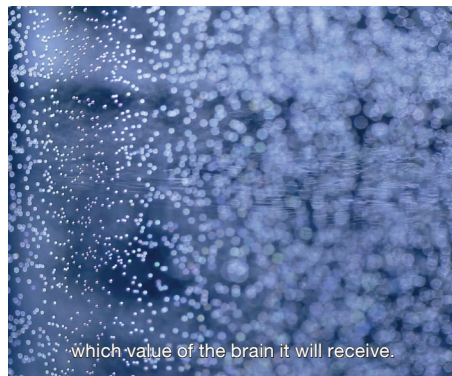
When we will control the speed, and after that it will stop.



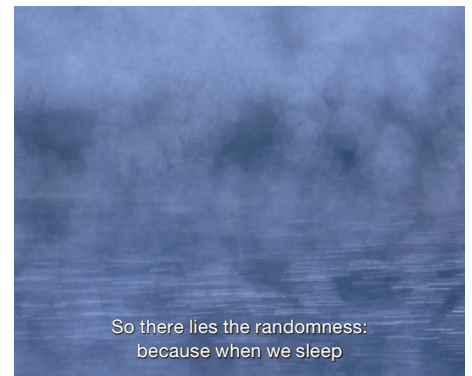
There, you see all the states



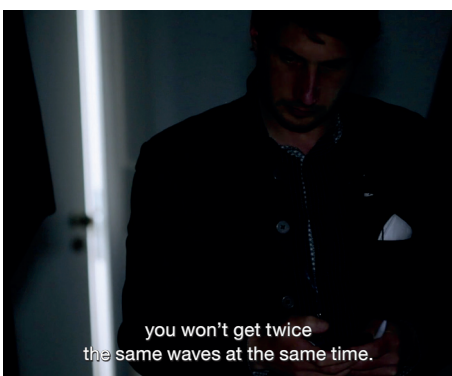
there are variations because we don't know



which value of the brain it will receive.



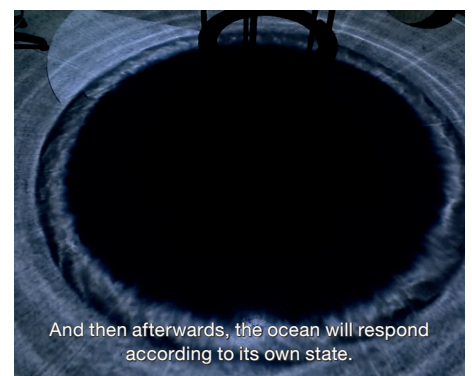
So there lies the randomness: because when we sleep



you won't get twice the same waves at the same time.



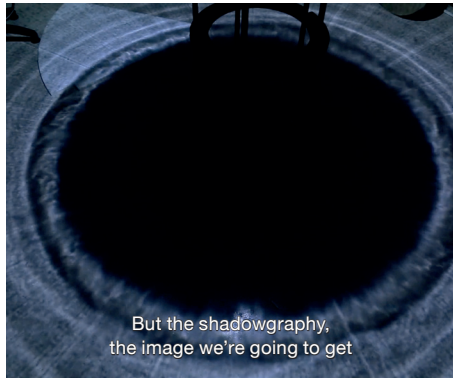
We define states with speeds.



And then afterwards, the ocean will respond according to its own state.



is entirely dependent on this basin.



But the shadowgraphy,  
the image we're going to get



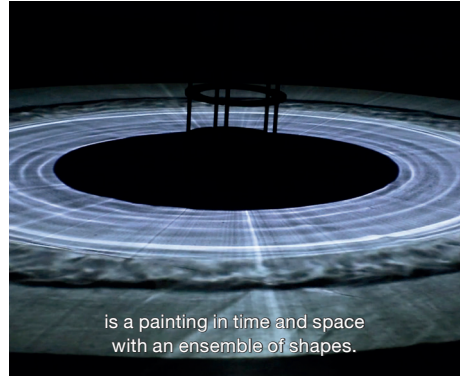
There, already, the speed,



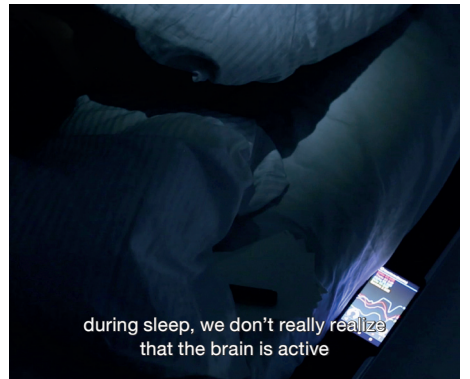
trying to control an let go simultaneously,



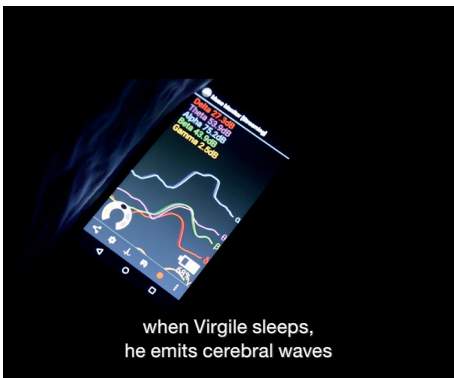
is an artistic method,  
a creation of an artistic universe.



is a painting in time and space  
with an ensemble of shapes.



during sleep, we don't really realize  
that the brain is active



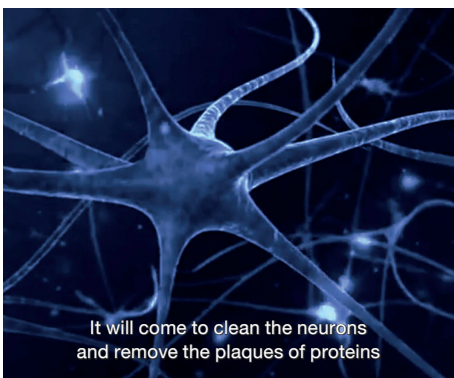
when Virgile sleeps,  
he emits cerebral waves



There are cleaning waves



of the cephalic-spinal fluid within the brain



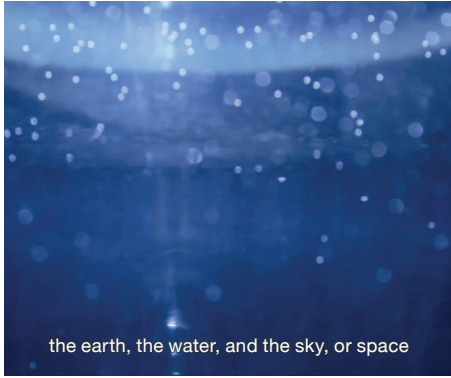
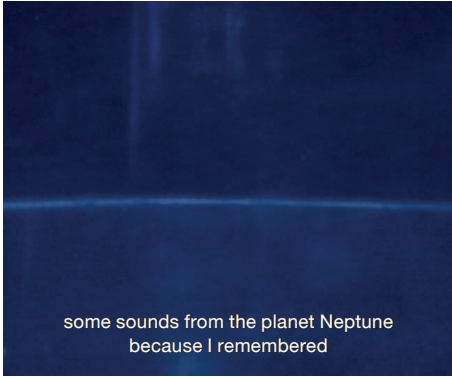
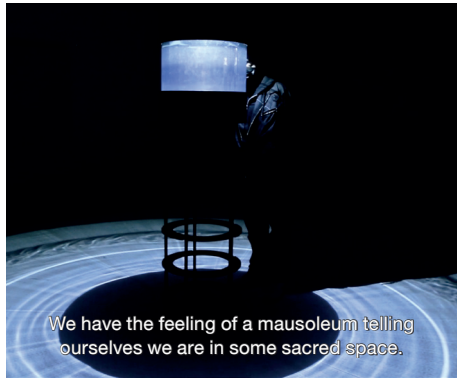
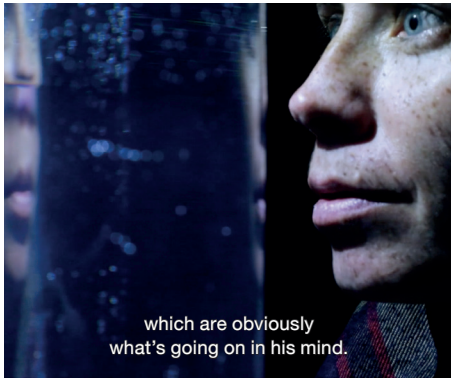
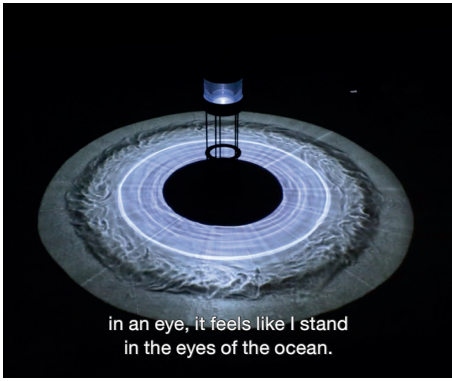
It will come to clean the neurons  
and remove the plaques of proteins



There is also the feeling  
of time that stands still

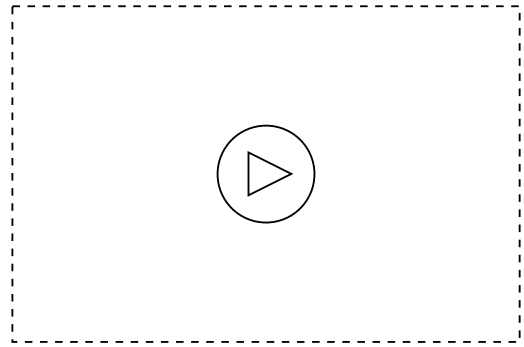


to meditate or to reflect



This contribution was published on [www.able-journal.org](http://www.able-journal.org) in a video.able format:

[www.able-journal.org/en/reve-quantique](http://www.able-journal.org/en/reve-quantique)



## credits

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Walid Breidi, digital artist

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## about the authors

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**Virgile Novarina**, after studying mathematics and physics, devoted himself to the artistic exploration of his own sleep through writings, drawings, photographs, and films. The very act of sleeping has become an integral part of his work through performances during which he sleeps publicly. His encounter with digital artist Walid Breidi led to different projects involving brainwaves, interactivity, and digital art.

**Walid Breidi** is a multidisciplinary digital artist. His creative tools come from the digital technology that surrounds us and on which we increasingly depend in our daily lives. His encounter with Virgile Novarina in 2010, led to three projects articulating sleep art with digital art: Paradoxical Bubble, Sleep in the City, and Quantum Dream.

<https://walidbreidi.com>

**LABOFACTORY** is an experimental artistic collective created in 2005. It explores a territory between arts and sciences, a research space favourable to a shared imagination and new narratives, to redefine the vision and ethics of science and art in a sensitive and poetic narration of the world.

**Jean-Marc Chomaz** (PhD) is an artist physicist, director of research at the CNRS, professor at the École Polytechnique, co-founder of the LABOFACTORY collective, and co-bearer of the Chaire Arts & Sciences

**Laurent Karst** is an architect-designer, graduated from the Strasbourg School of Architecture and the Domus Academy of Milan in industrial design.

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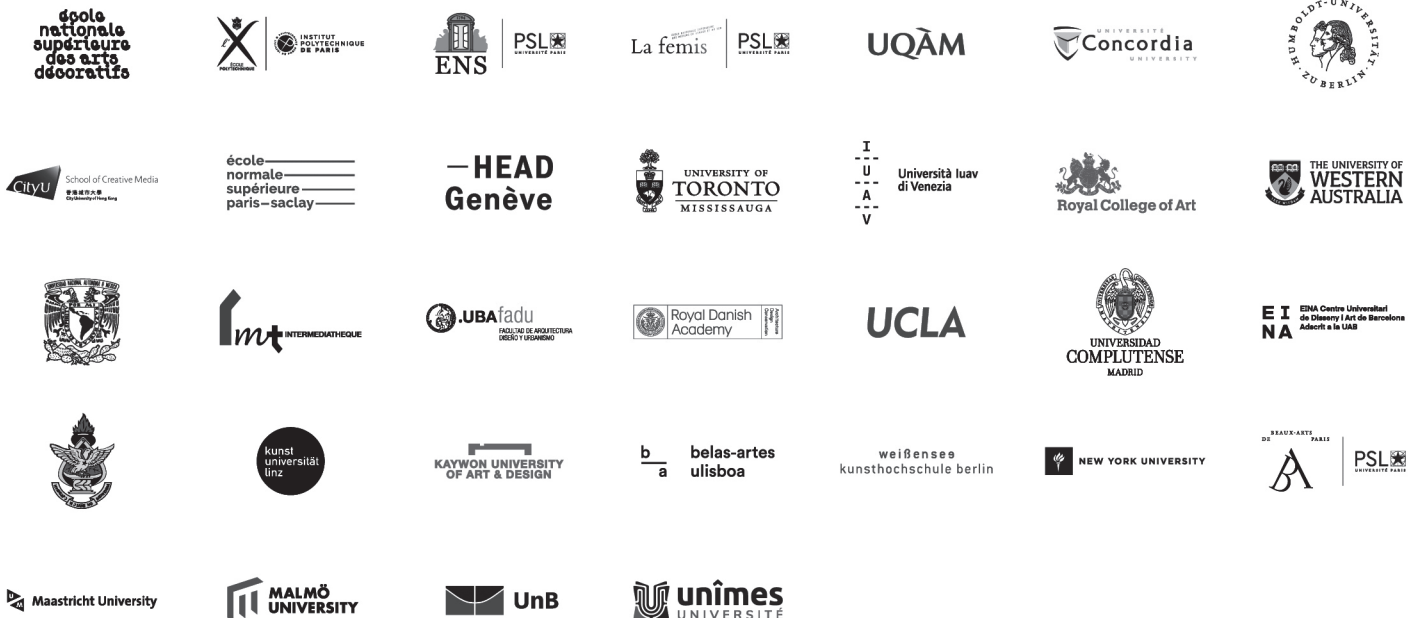
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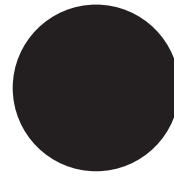


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