

LE RAYON EXTRAORDINAIRE

A project by Flavien Théry & Fred Murie

Scientific collaboration: Julien Fade

Music: Thomas Poli

Le rayon extraordinaire offers a sensitive approach to a reality that is usually imperceptible to the human eye: the polarization of light, a term describing the vibration trajectory of the waves that make it up. Through some twenty works, combining optical principles and digital technologies, this exhibition invites us to explore this hidden dimension, revealing a porosity between real and virtual, natural and artificial worlds.

This project was born from the collaboration of the artistic duo Flavien Théry & Fred Murie with researcher Julien Fade, as part of an Art & Science residency at the Foton Institute (Rennes 1 University / CNRS). The soundtrack composed by the musician Thomas Poli, broadcasted within the exhibition, helps to establish a climate conducive to immersion in a poetic vision of the world around us.

The large audience it was able to reach during the presentation at the Champs Libres, from November 2022 to March 2023, testifies to the balance found between a demanding artistic approach and a proposal accessible to the greatest number.

Initially designed for a space of 400 m², the exhibition can however be adapted to different contexts while maintaining its coherence. The project can also be extended through a concert by Thomas Poli, accompanied or not by a video performance by Flavien Théry & Fred Murie.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

Partners: Institut Foton (Université Rennes 1/INSA/CNRS), Service culturel de l'Université Rennes 1, Hôtel Pasteur, INSA de Rennes, Section Arts Plastiques du département des Humanités de l'INSA, Station Marine de Concarneau (MNHN), Project Lab / Pôle de Mécanique et de Technologie de l'Université Rennes 1, Institut des Sciences Chimiques de Rennes, Edulab de l'Université Rennes 2, Les films de l'autre côté, Impersonal Freedom.

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BEYOND OUR PERCEPTION

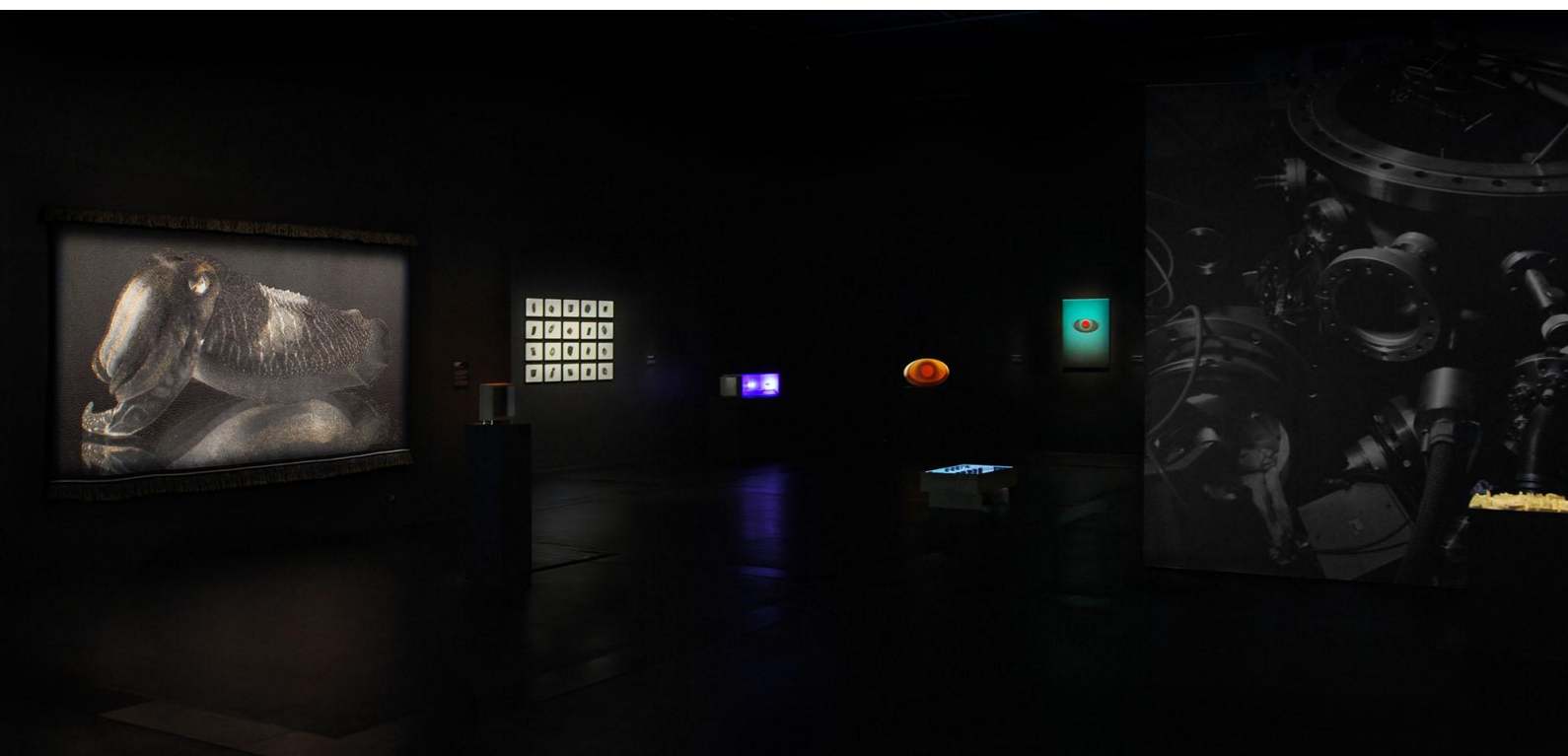
If the reflection of the landscape on the surface of the water constitutes the most common and the oldest factory of images that human beings have been able to experience, it is also the most widespread source of polarized light. Similarly, we are generally unaware that the blue of the sky, the iridescence on the wings of certain birds or the display of liquid crystal screens, constitute various manifestations of this physical phenomenon.

But it was the doubling of an image seen through *Iceland Spath* — a calcite crystal — that led to the discovery of polarization in the early 19th century. Physicists then described this “wonderful and unusual phenomenon”, as resulting from the trajectories of an ordinary ray, which follows the normal laws of refraction, and an extraordinary ray, which evades them. And it is this original wonder that this project aims to rediscover by offering the public the direct experience of devices that are based on scientific principles to deploy a poetic world.

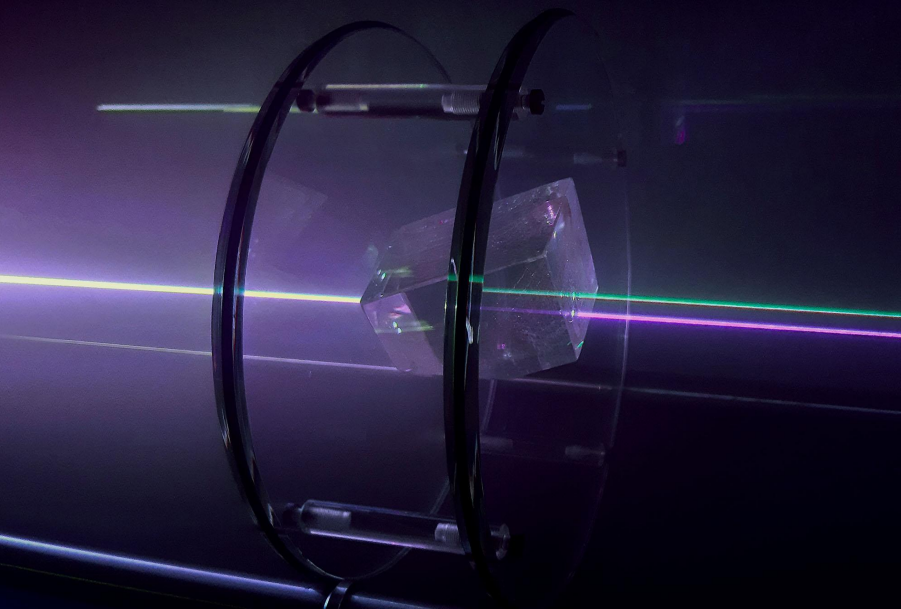
The piece entitled *Le rayon extraordinaire*, setting in motion a crystal crossed by a laser beam, introduces the visitor to a route that brings together traditional techniques and digital media, contemplative proposals and immersive experiences.

Thus, a sculpture inspired by a mathematical model evoking an eye, a series of charcoal drawings approaching the dark side of crystal, optical-digital sculptures deploying abstract forms based on optical phenomena, obsidian stones dividing white light in changing hues, a virtual ocean revealed by reflection on a black surface, landscapes appearing by elevation of photographic shots, the secret language of a cuttlefish showing itself through a tapestry and a video installation, the confrontation of stuffed animals and old scientific instruments staged in stereoscopic video-projections, appear as so many windows opening onto an imaginary that takes us beyond what we think we know about reality.

Our senses give us access only to a tiny part of reality. The sciences, like the arts, strive to overcome this tangible and observable environment. The exhibition *Le rayon extraordinaire* thus intends to venture beyond our perception to reveal a world that arouses wonder and commands respect.



PIECES



Le rayon extraordinaire

Flavien Théry, Fred Murie & Julien Fade | 2022

Aluminum, steel, plexiglass, calcite crystal, RGB laser, fogger, motors, electronics. | 12 0x 30 x 30cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

At the origin of the discovery of the phenomenon of light polarization, a crystal Iceland (Calcite), is here rotated and crossed by the beam of a white laser, which emerges separated into two parallel rays. Highlighted by changing and always complementary hues, these two rays are still today designated in the scientific literature as being the *ordinary ray* and the *extraordinary ray*.

www.speculaire.fr/work/le-rayon-extraordinaire

L'œil était dans la pierre

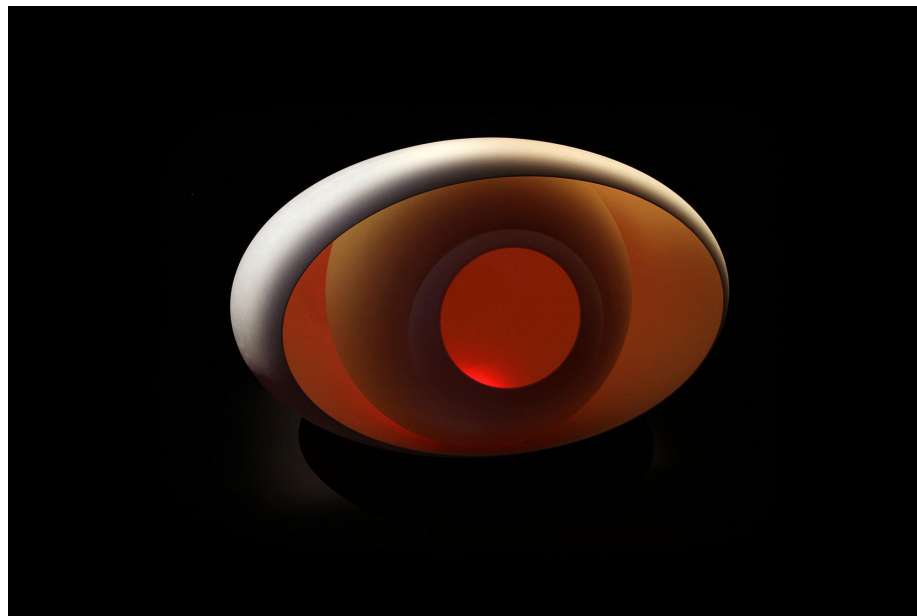
Flavien Théry & Fred Murie | 2021

3D digital printing PLA | 64 x 40 x 50 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

The separation of ordinary and extraordinary rays, during the crossing of a calcite crystal, is theorized by a mathematical model called the *Fresnel wave surface*. In the same gesture as the mineralogist seeking the heart of the stone, the cut of this theoretical form reveals an eye, evoking the presence of a gaze capable of perceiving a dimension of the reality that escapes us.

www.speculaire.fr/work/loeil-etait-dans-la-pierre



Cette obscure clarté

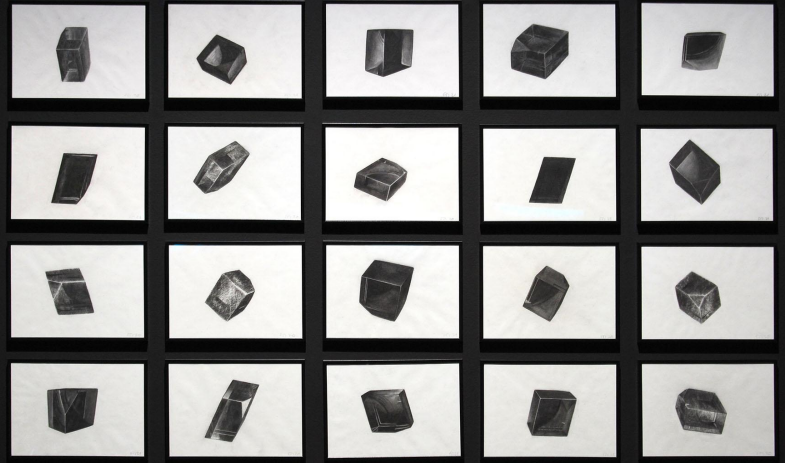
Fred Murie | 2022

Charcoal drawings | 29.7 x 21 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

Like the first scientists fascinated by the optical qualities of calcite crystal, Fred Murie's gaze was absorbed by the play of reflections and refractions of light. This series of charcoal observation drawings tries to approach the mysteries of this monolith by revealing its dark side.

www.speculaire.fr/work/cette-obscur-clarte



La trahison des modèles

Fred Murie | 2022

Oil painting on canvas | 70 x 100 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

By letting the black background appear under the layer of pigments, the *Fresnel wave surface* emerges here from the color to find a new incarnation. The presence of this gaze within the painting detaches itself from the mathematical model from which it is inspired, to invite us to dive into another reality.

www.speculaire.fr/work/la-trahison-des-modeles

Point de divergence

Fred Murie | 2022

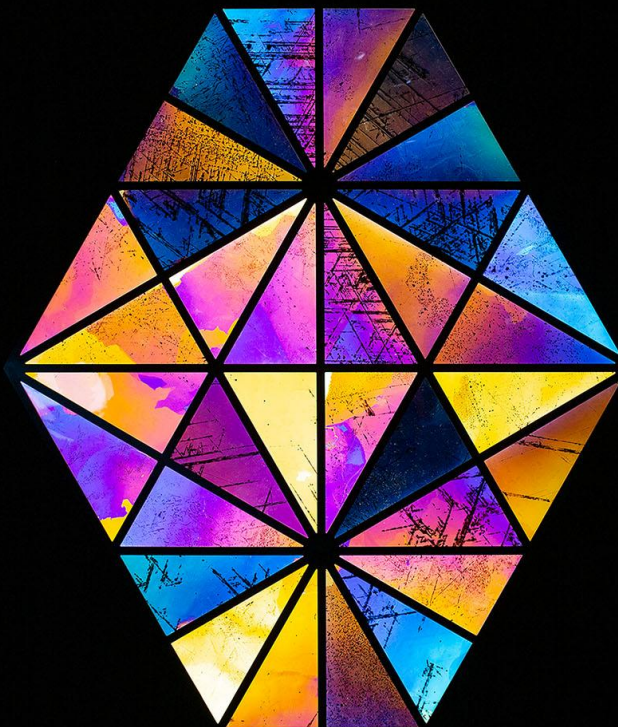
Plaster on metal frame | 120 x 76 x 30 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

Entering the calcite crystal, the ray dissociates by polarizing, giving birth to the ordinary ray, which continues its course, and to the extraordinary ray, which is deflected. This sculpture gives substance to this moment by stretching it over a wavelength and a half until it describes a fragile movement that would have been frozen in matter.

www.speculaire.fr/work/point-de-divergence





Dear Brewster

Flavien Théry | 2022

Plexiglas | Mica Sheets | Polarizing filters. | 88 x 101 x 15 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

Tribute to Sir David Brewster, this work takes up a geometric figure from his famous *Treatise on Kaleidoscope*, showing the pattern of symmetry obtained by the play of multiple reflections within a triangular module made up of three mirrors. The tints observed in polarized light, changing according to the point of view of the observer, are due to the optical qualities of mica, a natural crystal which splits into fine birefringent blades.

www.speculaire.fr/work/dear-brewster



Cristaux liquides

Flavien Théry & Fred Murie | 2022

Plexiglas | PVC | Modified liquid crystal display | LEDs | Video (6 min 40) | 100 x 92 x 30 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1 | Collaboration : Yann Molard (Institut des Sciences Chimiques de Rennes).

Like a microscope slide that has been disproportionately enlarged, this thin slab of liquid crystal glass allows us to see the sudden transitions, crystallizations or liquefactions observed in polarized light during temperature changes applied to liquid crystal samples.

www.speculaire.fr/work/cristaux-liquides

À la surface des ondes | À travers le cristal | Surface des indices

Flavien Théry & Fred Murie | 2021

Plexiglas | Wood | Modified Liquid Crystal Displays | Synchronized videos | 98 x 59 x 32 cm.
Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

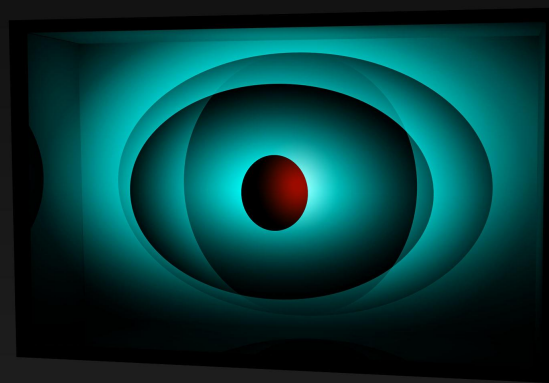
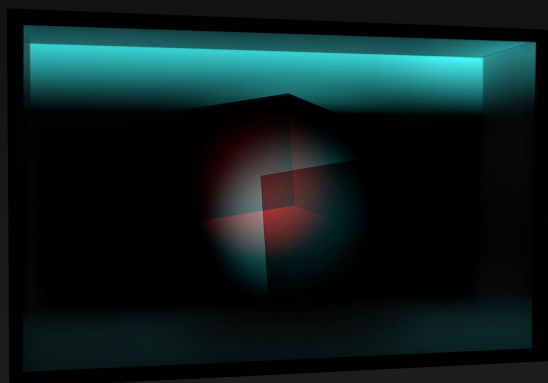
This set of optical-digital sculptures offers three looks at calcite crystal, the light waves that pass through it and the mathematical model that describes this phenomenon. It is proposed here to seek the best point of view to apprehend these illusions made possible by the diversion of liquid crystal screens, a technology based on the optical principle of polarization.

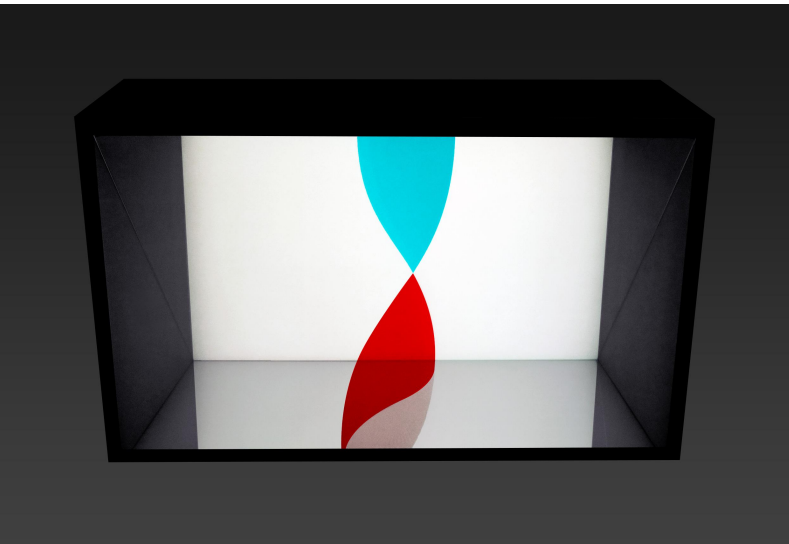
À travers le cristal suggests the geometric shape of the calcite crystal, through which shines a glow evoking the mysteries that have long shrouded its wondrous properties.

À la surface des ondes gives the illusion of a surface of water animated by a movement resulting from the phase shift between two waves, evoking the trajectories of ordinary and extraordinary rays.

Surface des indices offers an animated version of the mathematical model of Fresnel which stretches and contracts according to the variation of the index, evoking a slow breathing.

www.speculaire.fr/work/a-la-surface-des-ondes | www.speculaire.fr/work/a-travers-le-cristal | www.speculaire.fr/work/surface-des-indices





Dual

Flavien Théry | 2014

Plexiglas | Medium | Mirror | Modified Liquid Crystal Displays |
Computer & dedicated application | 101.5 x 75 x 63 cm.
Production: Espace d'Art Contemporain André Malraux – Colmar.

Two liquid crystal matrices interact through a mirror to allow the three-dimensional display of a kind of membrane, the two sides of which are presented in complementary colors, which seems to emerge from a wall and undulates as it crosses all the space available, inside the device, to blend into the opposite wall.

www.speculaire.fr/work/dual

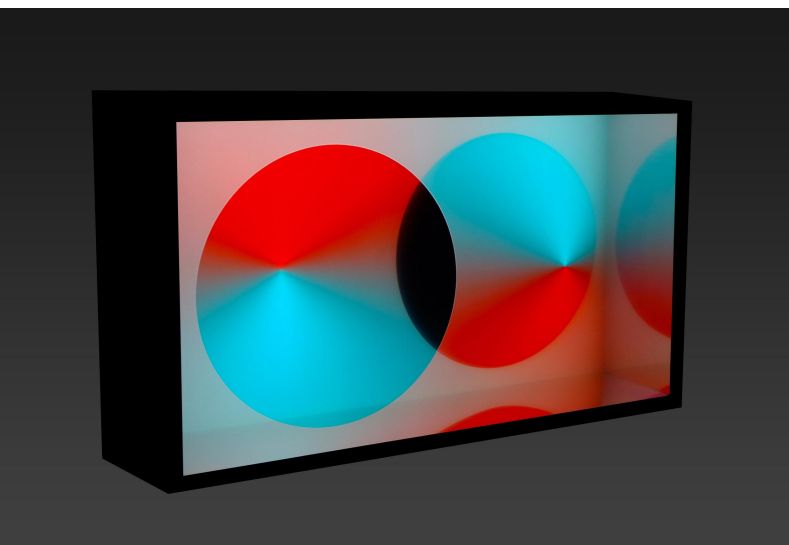
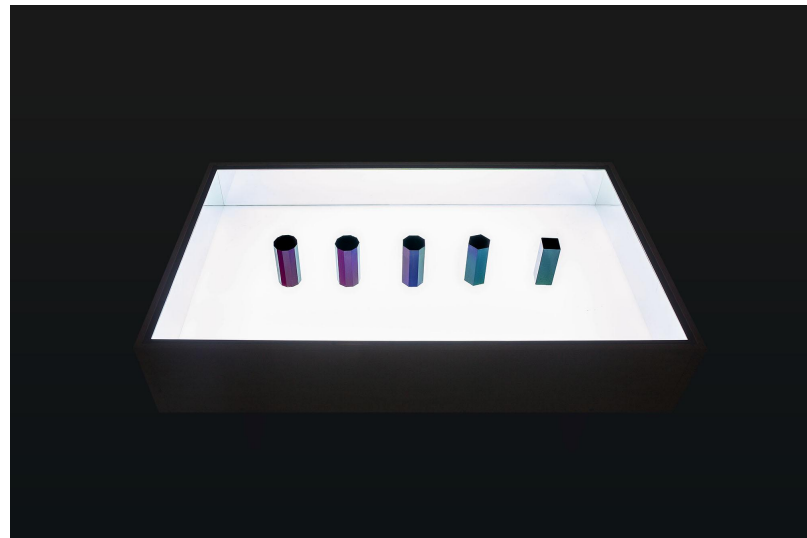
Dividers

Flavien Théry | 2014-22

Obsidian | Modified 42" LCD screen | Memory card | Arduino |
100 x 59 x 18 cm.

According to Newton's theory, visible light should be divided into seven primary colors in order to achieve musical harmony. Here, five black obsidian stones are arranged on a luminous screen, each with a different number of facets. Moving around the device, the stones can be seen acting like prisms that break up white light into a varying number of colors, which also change depending on the point of view.

www.speculaire.fr/work/dividers



Vision Cones

Flavien Théry | 2016

Plexiglas | Wood | 2 modified 42" LCD screens | Computer |
102.5 x 61.5 x 30.5 cm.

Evoking both the shape of our visual field, as well as the name of the retinal cells capable of distinguishing colors, *Vision cones* offers to witness the construction by the brain of a perception in relief from flat images. Two virtual cones thus appear to us, one concave and the other convex. Whatever the point of view, their appearance seems consistent with the laws of conical perspective.

www.speculaire.fr/work/vision-cones



Le secret

Flavien Théry, Fred Murie & Julien Fade | 2022

Aubusson stitch digital weaving | Cotton, Lurex | 325 x 200 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

Avec le soutien de la Station Marine de Concarneau.

The common cuttlefish, *Sepia officinalis*, is quite an extraordinary animal. In addition to its amazing camouflage abilities, it is also able to perceive light polarization, and to emit polarized signals visible only to its species. A filming at the Marine Station of Concarneau made it possible to capture these mysterious signals.

Le secret translates this invisible signal through the metallic appearance of one of the threads making up the weaving of a digital Aubusson stitch tapestry. Illuminated in polarized light, and observed through an electro-optical filter, the aspect of this weaving is revealed to be changing, animated by a pulsation that evokes an attempt at communication expressed in a secret language.

www.speculaire.fr/work/le-secret



Les discrètes

Flavien Théry, Fred Murie & Julien Fade | 2022

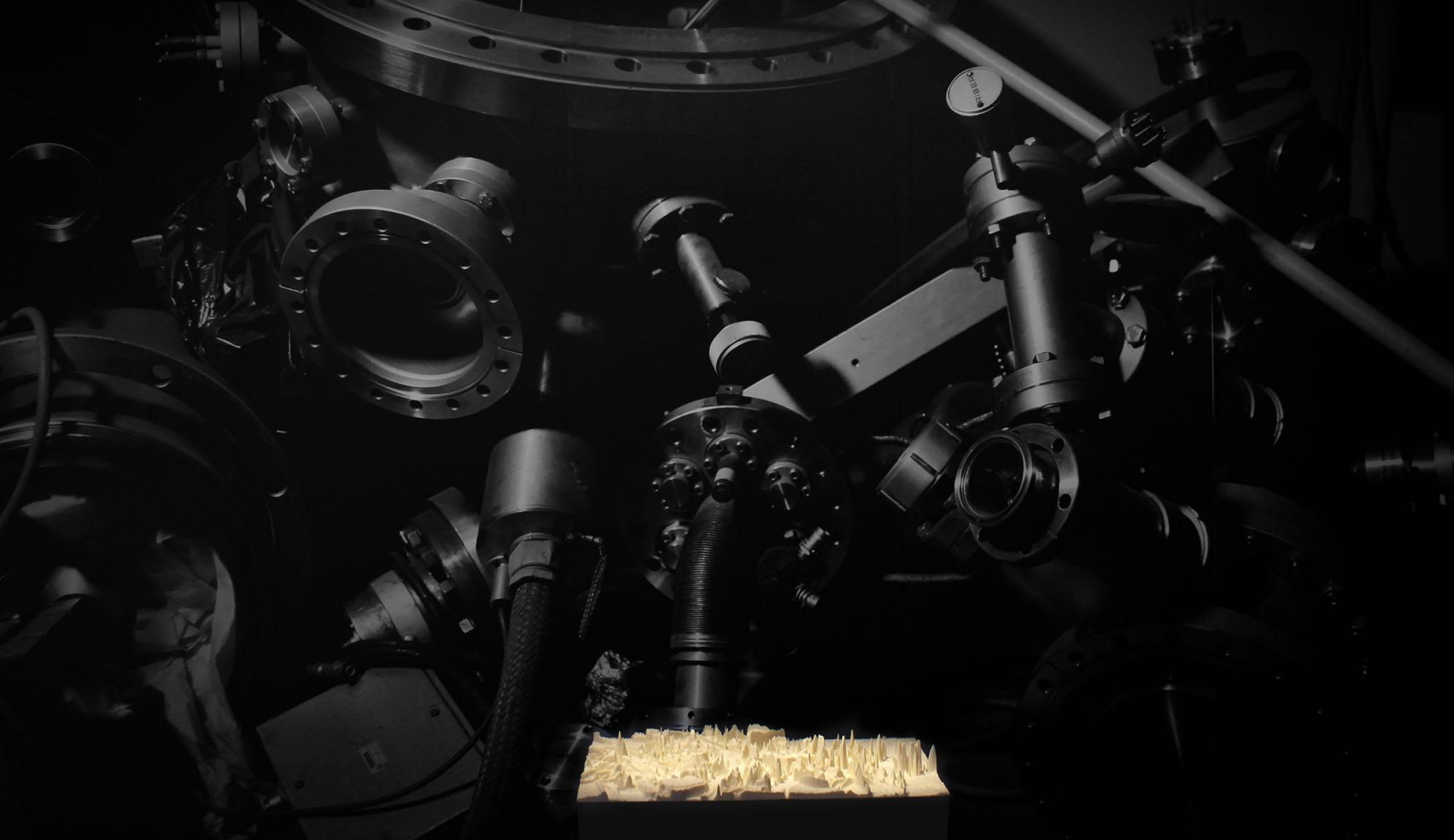
Wood | Modified Liquid Crystal Displays | Synchronized videos | 99 x 59 x 20 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

Avec le soutien de la Station Marine de Concarneau.

Les discrètes transcribes, in false colors, the imperceptible signals emitted by the cuttlefish in a video-optical device evoking the aquarium used for the filming, giving this strange cephalopod a diaphanous presence.

www.speculaire.fr/work/les-discretes



Élévation (métallique) | Élévation (électronique) | Élévation (optique)

Flavien Théry & Fred Murie | 2021

3D digital printing PLA | 73 x 49 x 8cm | Printed wallpaper | 500 x 350 cm.

Three digital prints mounted on Dibond | 100 x 70 cm, 45 x 30 cm, 24.5 x 17 cm.

Black wood panel | Video projection (5 min 50) | 200 x 125 cm.

Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

Three scenes photographed behind the scenes of the Foton Institute laboratory, cellars populated by old scientific equipment with mysterious functions, are transformed into so many strange landscapes resulting from the three-dimensional extrapolation of polarimetric data captured on site.

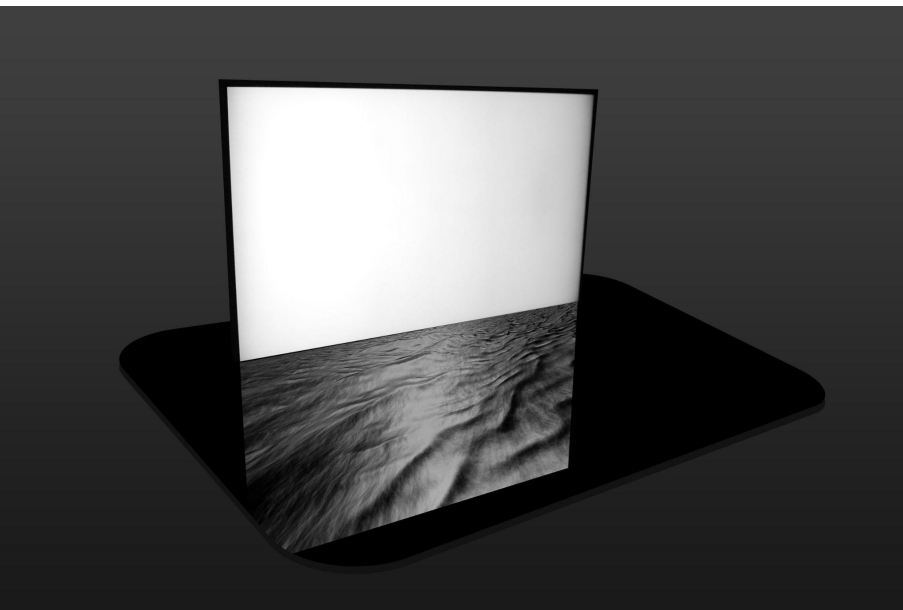
Élévation (métallique) brings together a sculpture evoking a strange topographical model and the scene from which this relief comes: a pile of metal parts photographed in the cellars of the laboratory.

Élévation (électronique) is a video installation broadcasting the slow overview of a volume revealing itself to be, sometimes an unreal landscape, sometimes the photograph of an old electronic card stored in the reserves.

Elevation (optique) replays the changeover, in three shots, from the photograph of an optical assembly left on a marble table, to a landscape in which everyone can project their imagination.

www.speculaire.fr/work/elevation-metallique | www.speculaire.fr/work/elevation-electronique | www.speculaire.fr/work/elevation-optique





Tu contemples ton âme

Flavien Théry & Fred Murie | 2022

Black plexiglass, wood | Modified 42" LCD display |
raspberry PI | Video Loop | 140 x 62 x 90 cm.
Production: Les Champs Libres, Rennes Métropole,
Spéculaire, Université Rennes 1.
Développement informatique : Marc Parenthoen
(CERV-ENIB, Brest).

If the reflection on the surface of the water is certainly the first image factory that humanity has been able to experience, it is also the first source of polarized light. This work stages this double game of reflection, revealing - below the surface - the image of a virtual ocean animated by movements corresponding to the waves captured during an electroencephalographic recording from a previous project titled *La mer est ton miroir*.

www.speculaire.fr/work/tu-contemples-ton-ame

Les insulaires

Flavien Théry & Fred Murie | 2021

Five digital prints mounted on Dibond | 101 x 57 cm.
Production: Les Champs Libres, Rennes Métropole,
Spéculaire, Université Rennes 1.

Different naturalized birds, from the collections of the University of Rennes 1, are observed using a method of polarimetric analysis, extrapolated in three dimensions, offering us a shift from their apprehension as biological organisms, to their perception as landscapes, like shimmering islands rising out of a dark ocean.

www.speculaire.fr/work/les-insulaires





Les renversants | Les clairvoyants

Flavien Théry, Fred Murie & Julien Fade | 2021

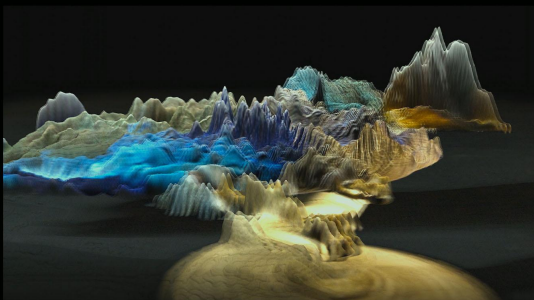
Dual 3D projection | Stereoscopic Glasses | Videos (5 min 50, 2 min 24) | 5 x 2.8 m.
Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

From the collections of the University of Rennes 1, a selection of optical instruments that have contributed to the study of light polarization, as well as stuffed animal specimens potentially capable of perceiving it, have been the subject of a studio shoot. The two videos produced on this occasion are projected opposite each other in stereoscopic relief made visible by an optical process based on polarization.

Les clairvoyants brings together and confronts scientific instruments and stuffed animals in a still life scene animated by a circular movement, in an endless loop.

Les renversants presents the very particular aspect that these same elements take on, when the polarized light they reflect is analyzed and extrapolated in three dimensions, shifting our perception of reading a flat image to that of a new landscape.

www.speculaire.fr/work/les-renversants | www.speculaire.fr/work/les-clairvoyants





Dans la lumière | Sous le ciel

Fred Murie | 2022

Virtual Reality Headsets | 2 interactive animations in loop (~7 min) | Swivel chair.
Production: Les Champs Libres, Rennes Métropole, Spéculaire, Université Rennes 1.

This double virtual reality experience reinterprets different elements from the exhibition in order to offer the viewer to immerse themselves a little more in this universe where scientific subjects become phantasmagorical objects.

Dans la lumière proposes to dive into the matter of the crystal, to slide on a light wave of light polarizing and dissociating into ordinary and extraordinary rays, then to penetrate to the heart of the eye of Fresnel and, finally, to let oneself be absorbed by absolute blackness. Who knows if Albert Einstein never realized his dream of riding the light and thus unlocked its secrets?

Sous le Ciel takes the visitor on a dizzying ascent through a world where the captured reality is augmented by another dimension. It becomes possible in turn to fly above a photograph taking shape, to rise through strange landscapes and discover their true nature, to contemplate a celestial vault drawing a fabulous animal and harvest the grains of polarized light which fall from it, like so many enigmatic messages.

www.speculaire.fr/work/dans-la-lumiere | www.speculaire.fr/work/sous-le-ciel

