Funded by
the European Union

ÈVE BARLIER UNDARK KICK OFF MEETING 2024

Bridging art and science

Introduction

ÈVE BARLIER UNDARK KICK OFF MEETING 2024

PROFILE

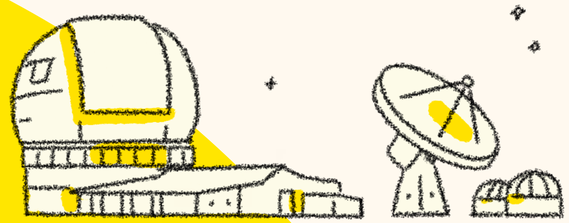
- Graphic designer & illustrator
- Specialised in scientific communication
- Print & digital design
- Illustration, diagrams, comics, book design, motion design...

Introduction

- Previous professional collaborations

ACADEMIC PUBLISHERS

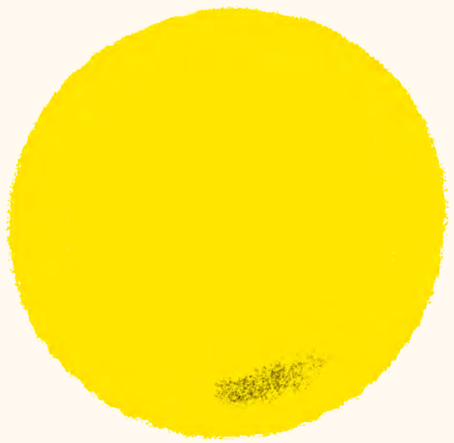
SCIENCE MUSEUMS



RESEARCH INSITITUTES

When art meets science

A path to share and enhance knowledge



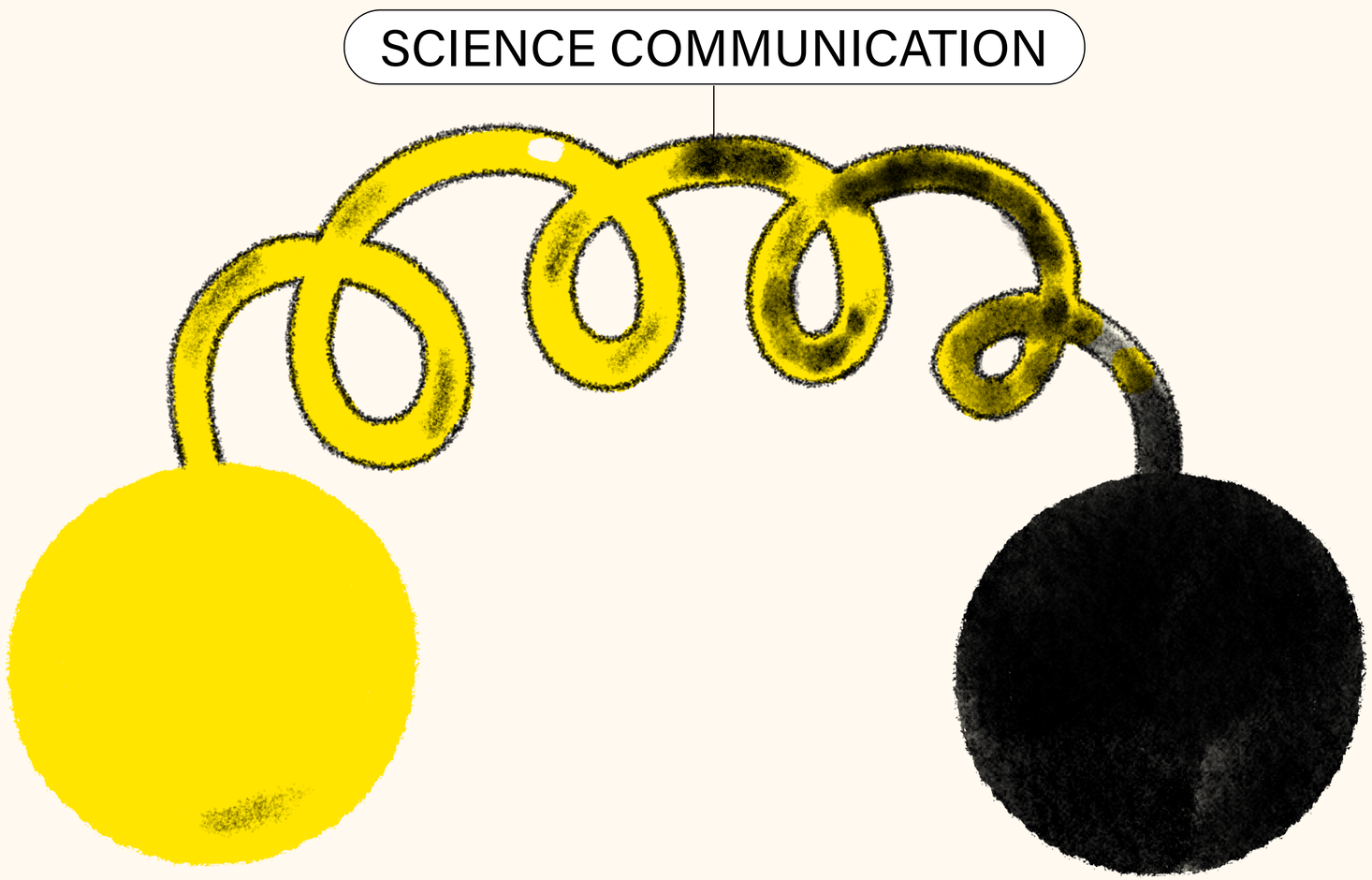
Art

Science

Ève Barlier — Instituto de Astrofísica de Canarias

When art meets science

A path to share and enhance knowledge



Ève Barlier — Instituto de Astrofísica de Canarias

When art meets science

A path to share and enhance knowledge

Turn complex topics into CLEAR, ACCESSIBLE & UNDERSTANDABLE messages

FACILITATE & INCREASE COMMUNICATION

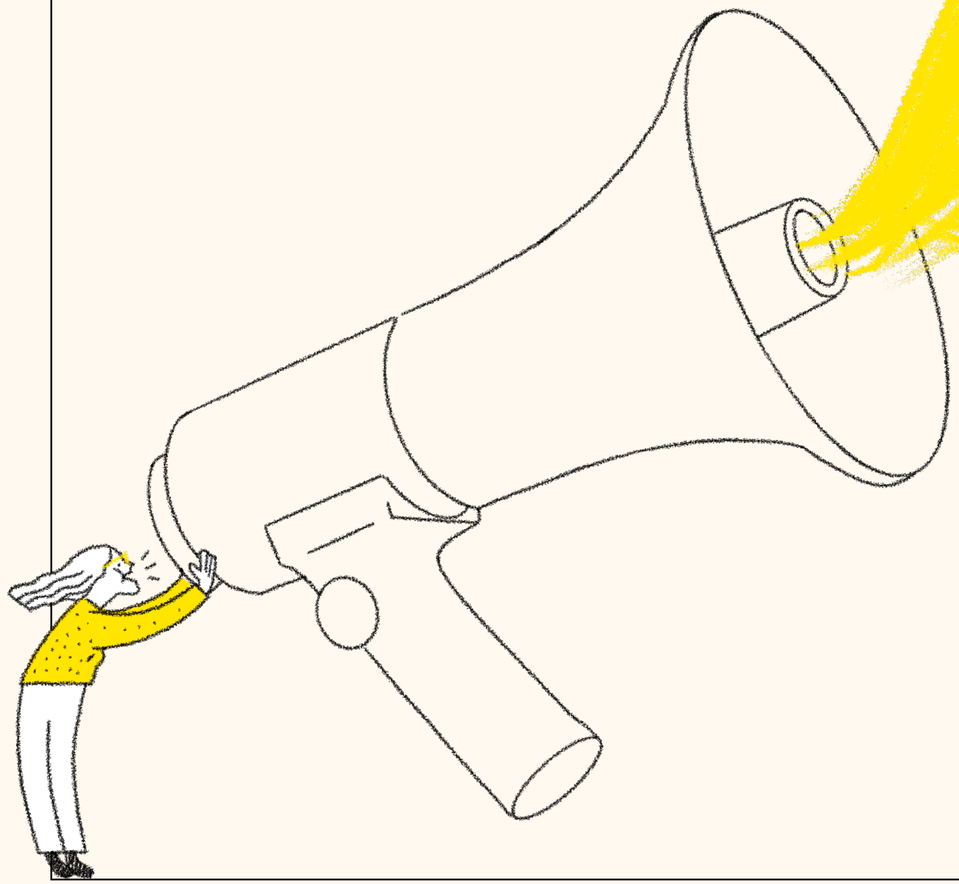
CATCH ATTENTION

FOSTER INTEREST

ATTRACT STAKEHOLDERS

VISUALISE THEORIES, PROJECTS AND RESULTS

PROMOTE



Ève Barlier — Instituto de Astrofísica de Canarias

When art meets science

1001 ways to depict our Universe

ILLUSTRATION

- Observation
- Artist's view
- Didactic visual
- Story, comic

Ève Barlier — Instituto de Astrofísica de Canarias

When art meets science

1001 ways to depict our Universe

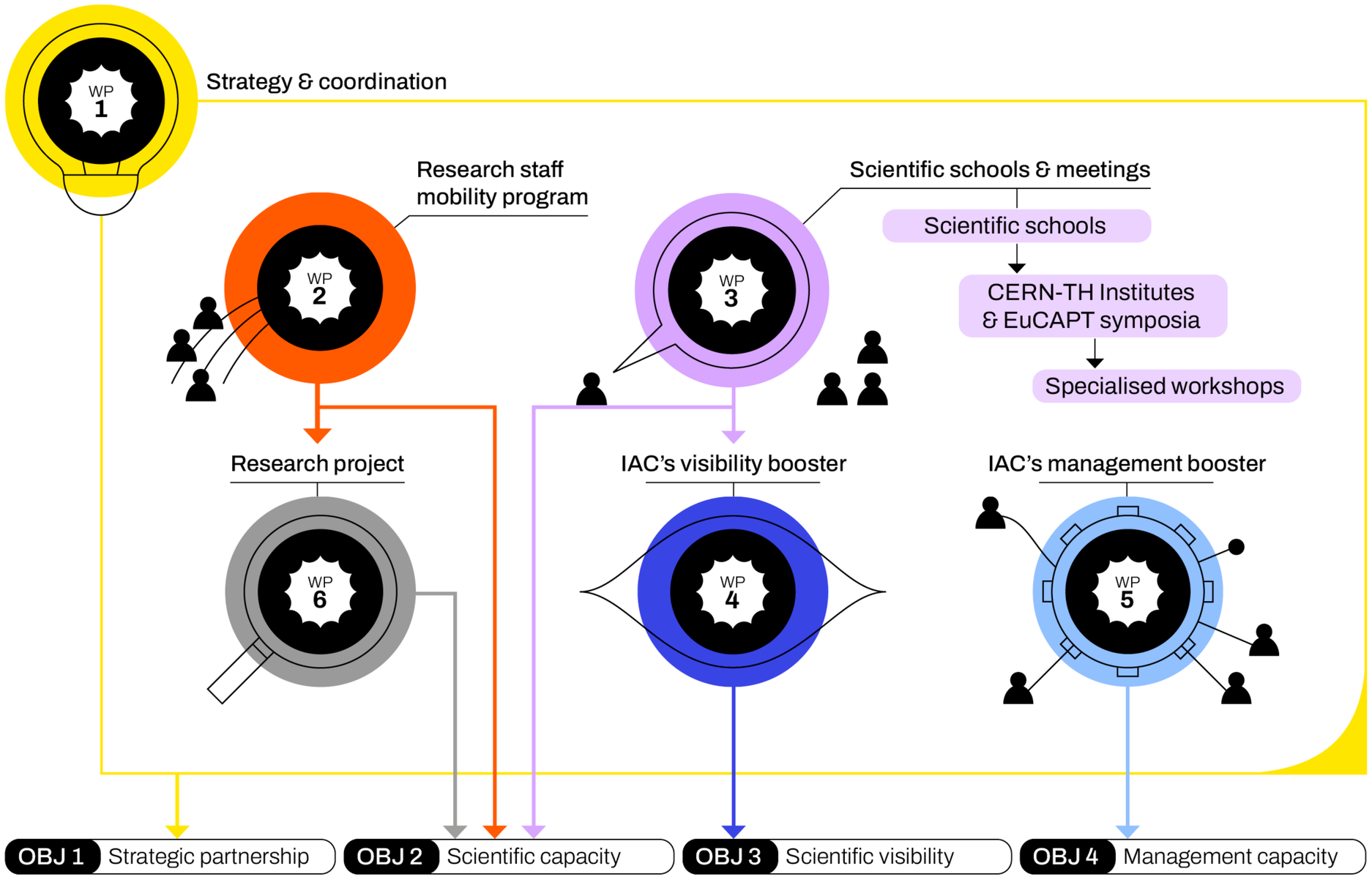
GRAPHIC & MOTION DESIGN

- Technical diagram
- Infographic
- Layout
- Animation

Ève Barlier — Instituto de Astrofísica de Canarias

Undark: an unsual collaboration

A full work package dedicated to communication

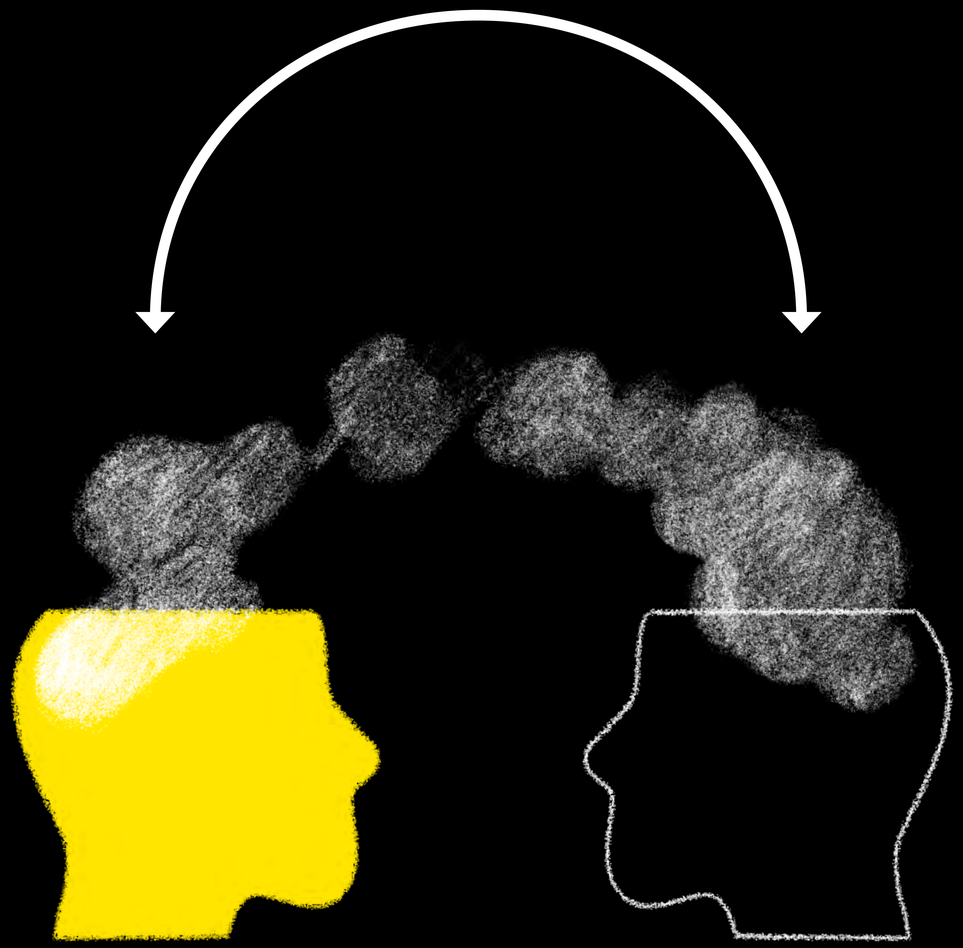


Ève Barlier — Instituto de Astrofísica de Canarias

Undark: an unsual collaboration

- **A wide public** from a general audience to field specialists

KNOWLEDGE TRANSFER



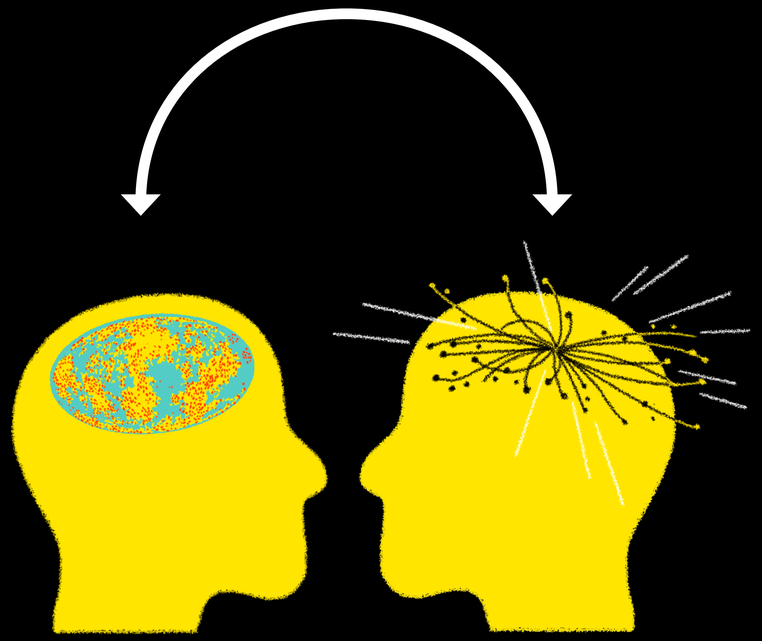
Ève Barlier — Instituto de Astrofísica de Canarias

Undark: an unsual collaboration

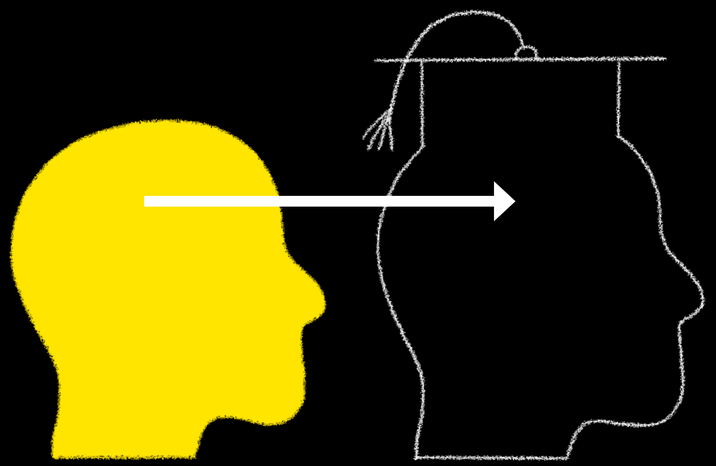
- **A wide public** from a general audience to field specialists

to the general public

KNOWLEDGE TRANSFER



between researchers

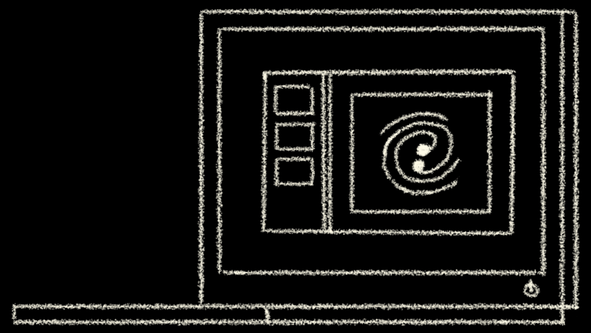


to pupils and students

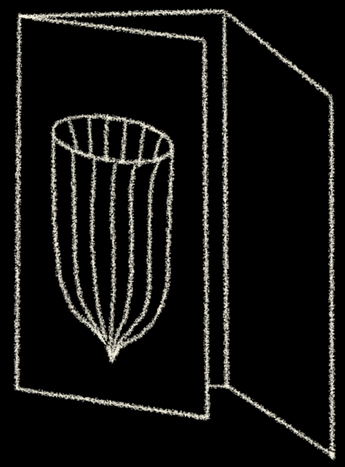
Undark: an unsual collaboration

Media production for internal and external communication

POSTERS

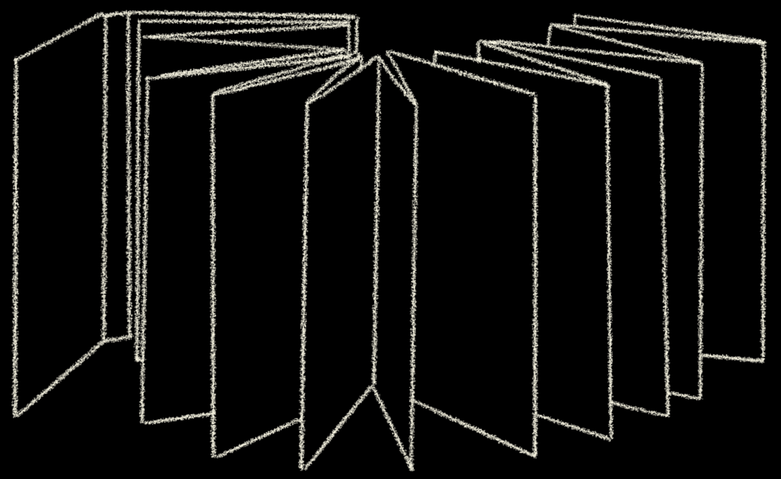


CONFERENCE
& PUBLICATION MATERIAL



BROCHURE

BOOKS
(LEPORELLI)



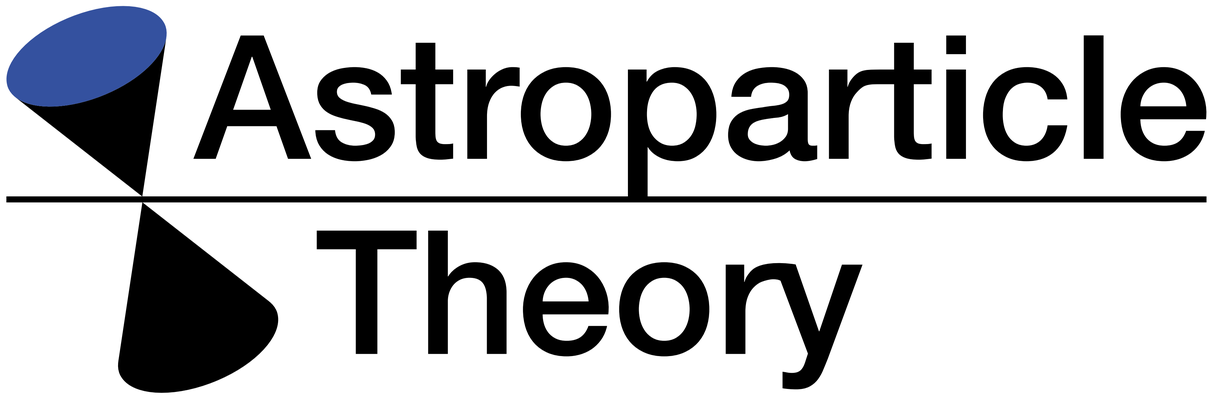
EXHIBITION

Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

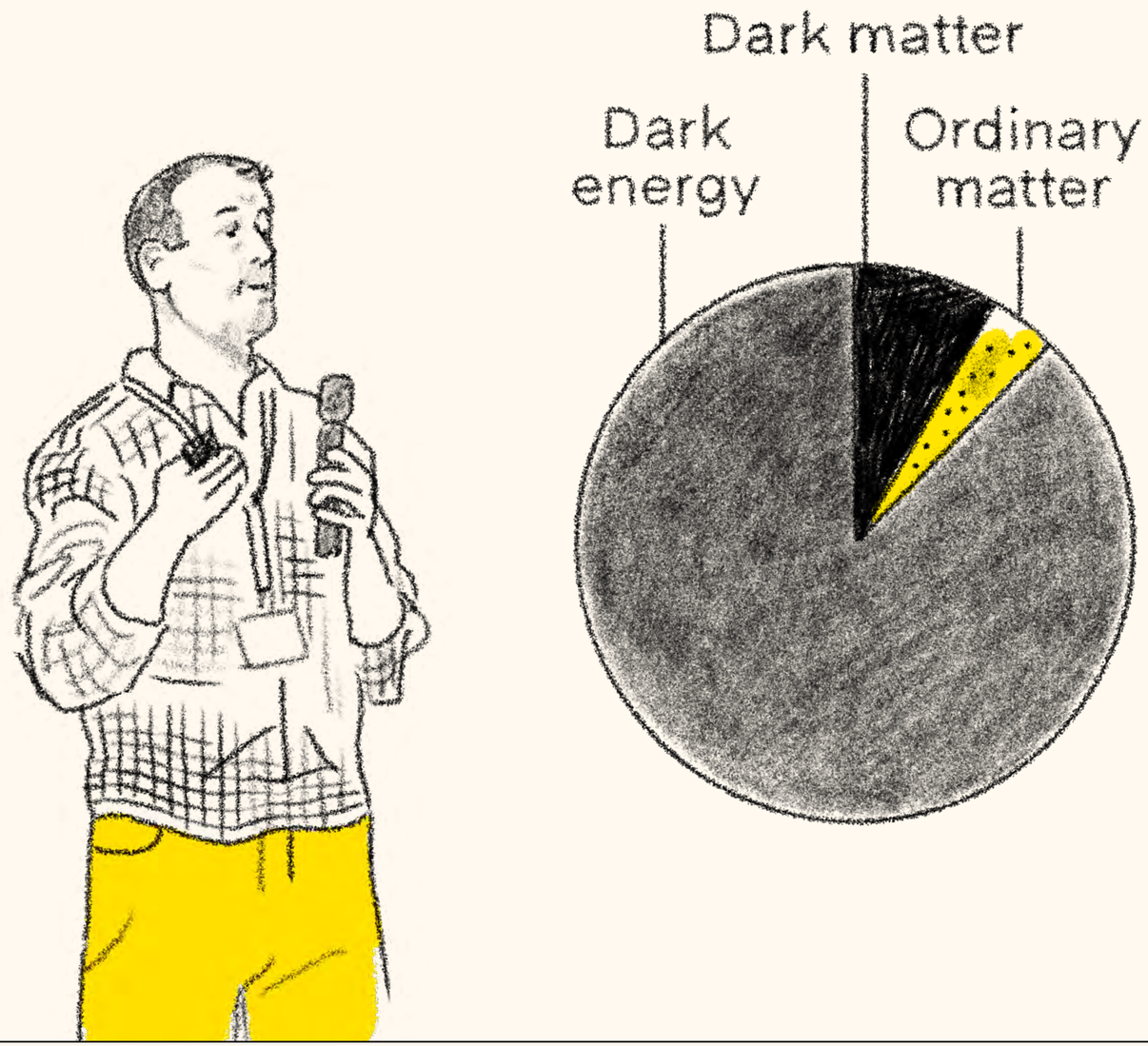
Astroparticle Theory logotype x J. M. Camalich, IAC, Spain

UNDARK



A portrait of the dark universe

Undark logotype x J. M. Camalich, IAC, Spain



A portrait of the dark universe

Undark logotype x J. M. Camalich, IAC, Spain

A portrait of the dark universe

Undark logotype x J. M. Camalich, IAC, Spain

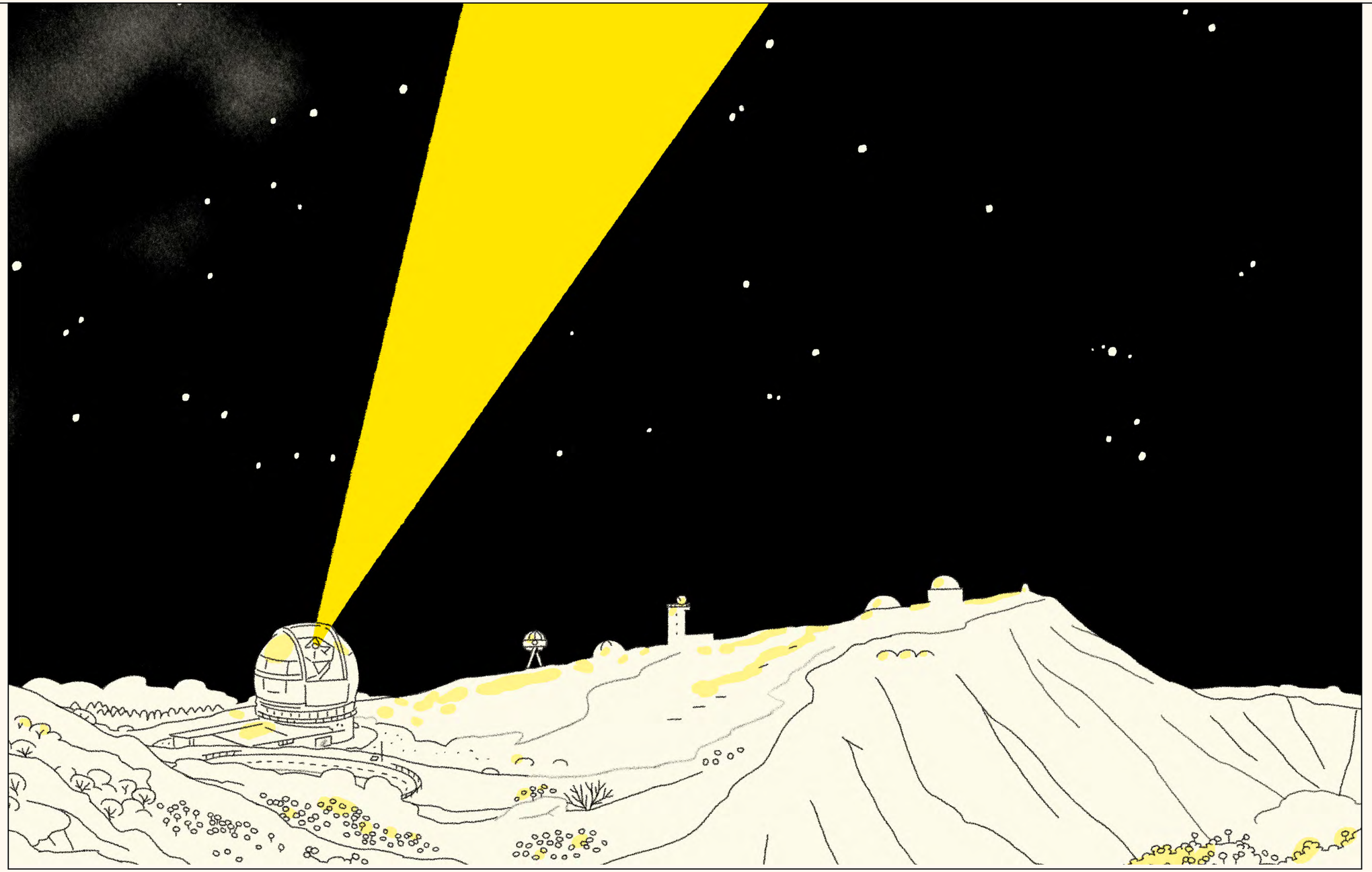
CONCEPT

- a pie chart of the estimated percentage of non-ordinary matter
- the GTC telescope (Gran Telescopio Canarias)

Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

Press release x J. M. Camalich & Iván Jimenez Montalvo, IAC, Spain



Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

EuCAPT brochure x Gabriela Baremboim, CERN & J. M. Camalich, IAC

UNDARK

EuCAPT

European Consortium for AstroParticle Theory

Where the Universe meets its constituents

About EuCAPT

The **European Consortium for AstroParticle Theory** (EuCAPT) was founded in 2019 with the task of meeting the modern challenges of **Cosmology** and **Astroparticle physics**.

This is a large, diverse and highly talented community striving to unravel our cosmological history and make discoveries that shape our future.

Our mission

EXCHANGE
ideas and knowledge

COORDINATE
scientific activities

ATTRACT
resources for research

PROMOTE
a stimulating environment

More information

EuCAPT currently counts more than 2,000 scientists from over 120 research centers in Europe. The central hub is located at CERN, Switzerland.

Graphic design: Ève Barlier
Conception: Gabriela Barenboim, Jorge Martin Camalich - 2024

eucapt.secretariat@cern.ch

eucapt.org

Director: S. Pascoli
Vice Director: D. Marsh

@EuCAPT

Acknowledgments

CERN APPEC EuCAPT

GOBIERNO DE ESPAÑA · MINISTERIO DE CIENCIA E INNOVACIÓN

This brochure was funded by DarkMaps, PID2022-142142NB-I00

A portrait of the dark universe

EuCAPT brochure x Gabriela Baremboim, CERN & J. M. Camalich, IAC

UNDARK

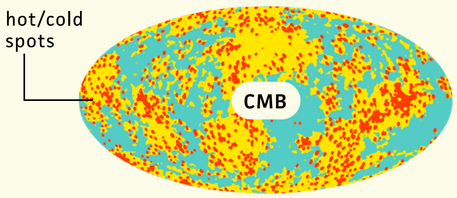
COSMOLOGY

Unravelling the history of our Universe

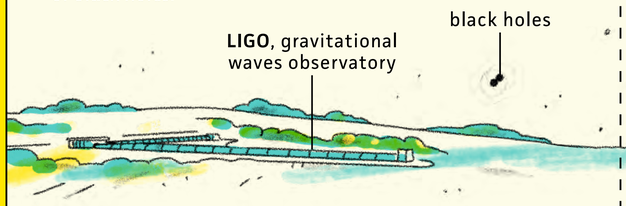
We have reconstructed our cosmic history by observing the most distant and ancient objects in the sky.

Our Universe was born 13.7 billion years ago, in a colossal explosion called the Big Bang, and it has been expanding ever since. The oldest known remnants from this event are traces of the first primordial elements that were forged when the Universe was hot and only a second old. The **cosmic background radiation**, or "CMB", offers the first clear picture of our Universe when it was just 380 thousand years old.

BIG BANG



Beyond traditional telescopes, the emergence of multi-messenger astronomy offers fresh insights into the Universe. For instance, the detection of gravitational waves in 2015, helped identify space-time ripples produced by the collision of black holes.

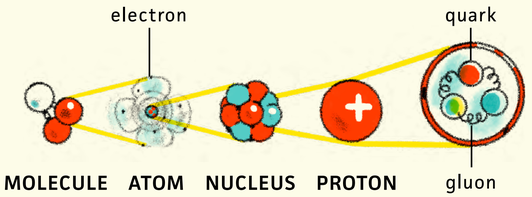


ASTROPARTICLES

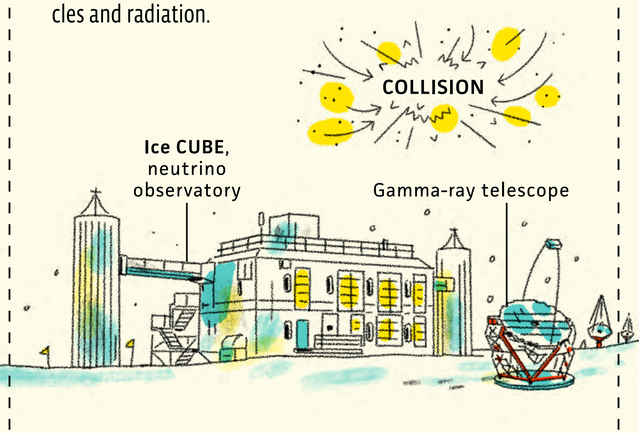
The cosmic particle laboratory

At the smallest scales, matter is composed of particles.

Particles interact via **fundamental forces**, such as the strong nuclear force, which binds quarks and gluons within protons, and the electromagnetic force, which binds electrons to protons within atoms.



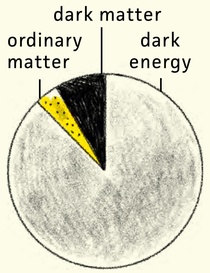
The Universe hosts cataclysmic events that can accelerate particles to very **high energies**. Capturing these "astroparticles" with our telescopes allows us to gain insights on their properties. Understanding the **fundamental laws** that govern particles is also crucial to describe the Universe shortly after the Big Bang, when it consisted of a hot soup of particles and radiation.



THE DARK UNIVERSE

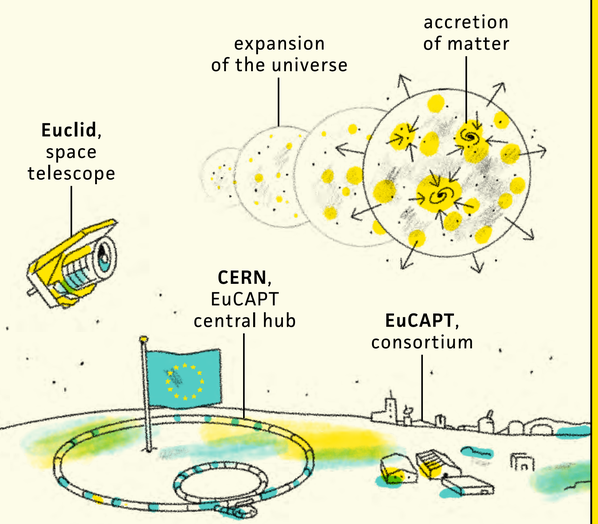
From the smallest to the largest scales

"Nothing exists per se except atoms and the void."
Lucretius - 1st century BC



Today, we know that our atoms merely make up a small fraction of the matter in the Universe. The rest is **dark matter**. We have also come to understand that vacuum is far from empty. It is imbued with a tiny **dark energy** that, at cosmological scales, is accelerating the expansion of the Universe.

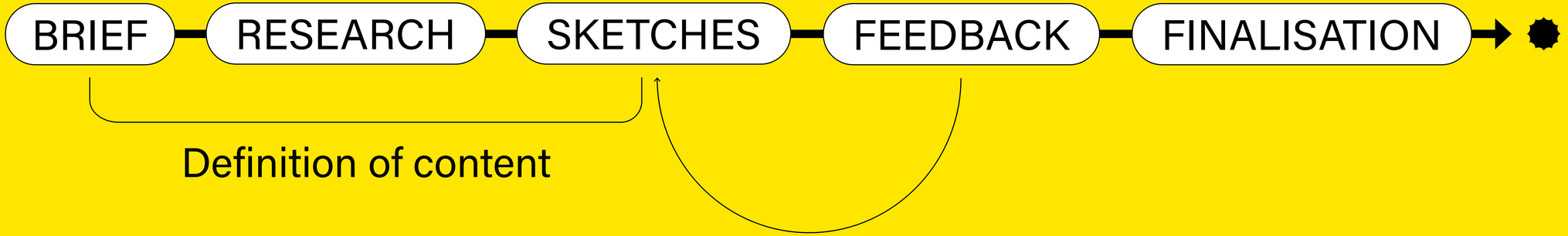
Discovering the nature of dark matter and dark energy stands as one of the paramount scientific challenges of the XXI[st] century. Other mysteries of this modern cosmological conundrum are the physics that governed the Big Bang and the **origin of matter** itself.



Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

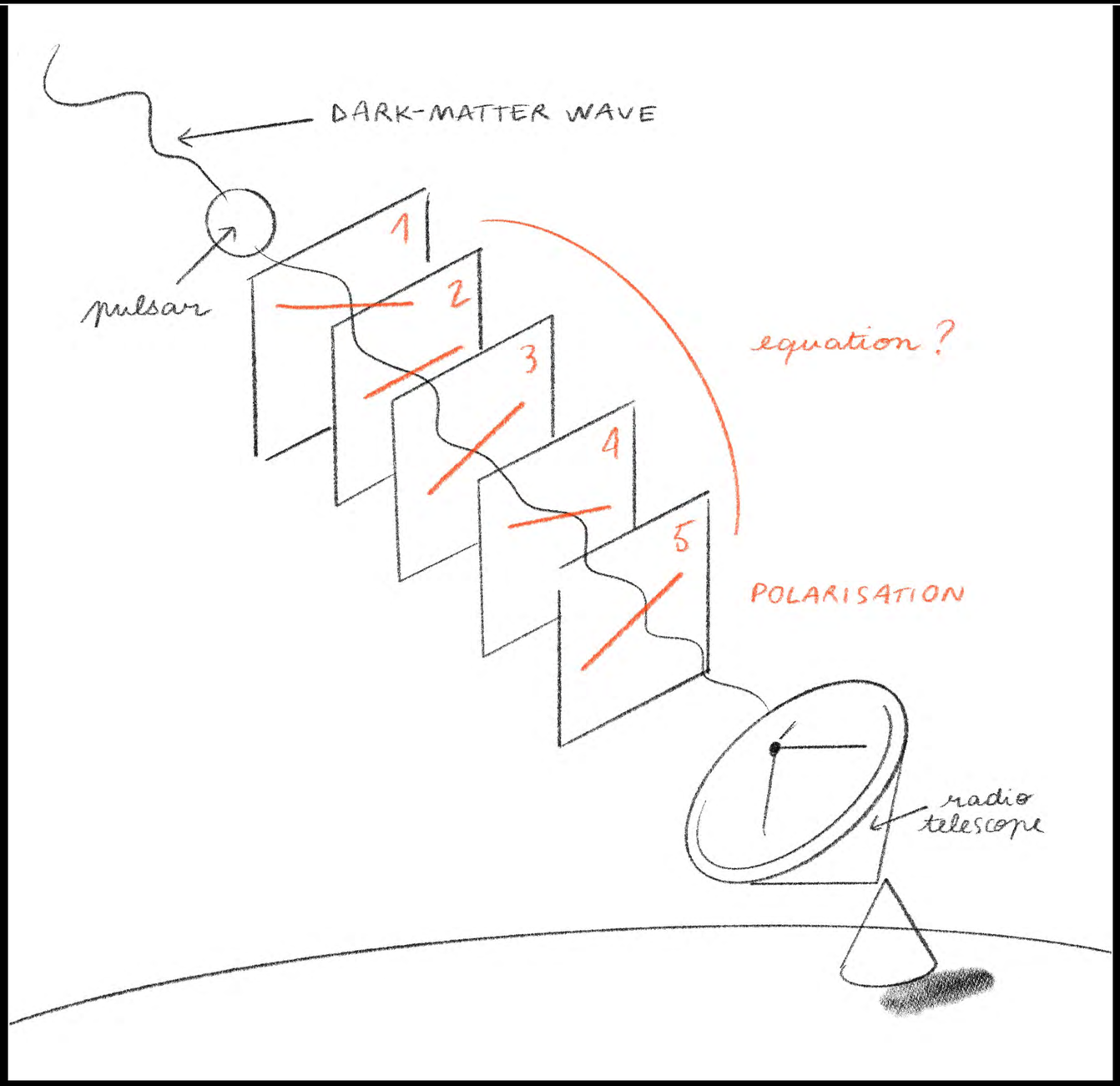
Collaboration process



A portrait of the dark universe

Illustrations for papers x J. M. Camalich, IAC, Spain

UNDARK



CONCEPT

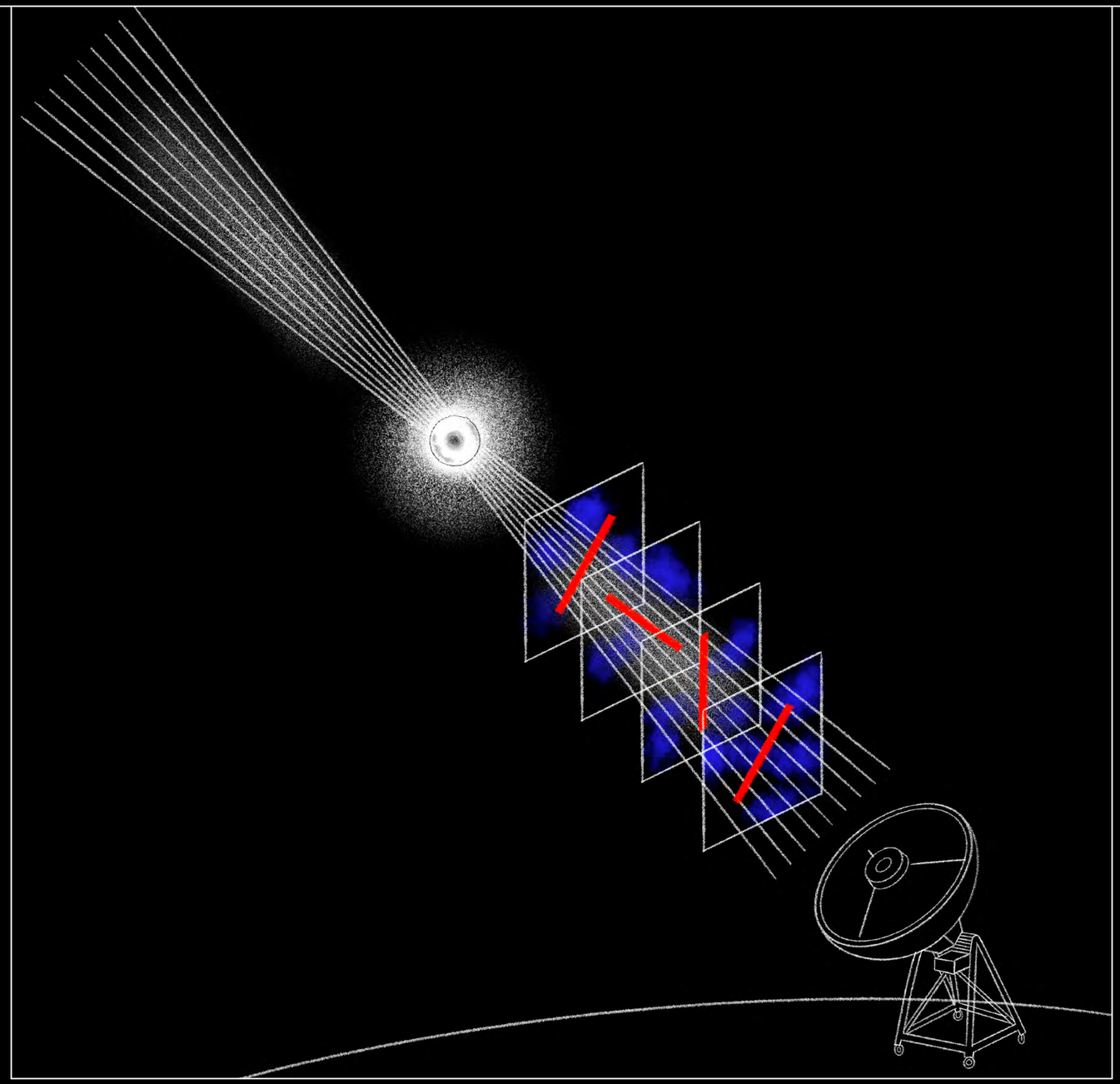
- visualisation of the birefringence of a pulsar's polarised radio-wave emission induced by axion dark matter wave
- combining technical informations and a global illustrative view

Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

Illustrations for papers x J. M. Camalich, IAC, Spain

UNDARK



CONCEPT

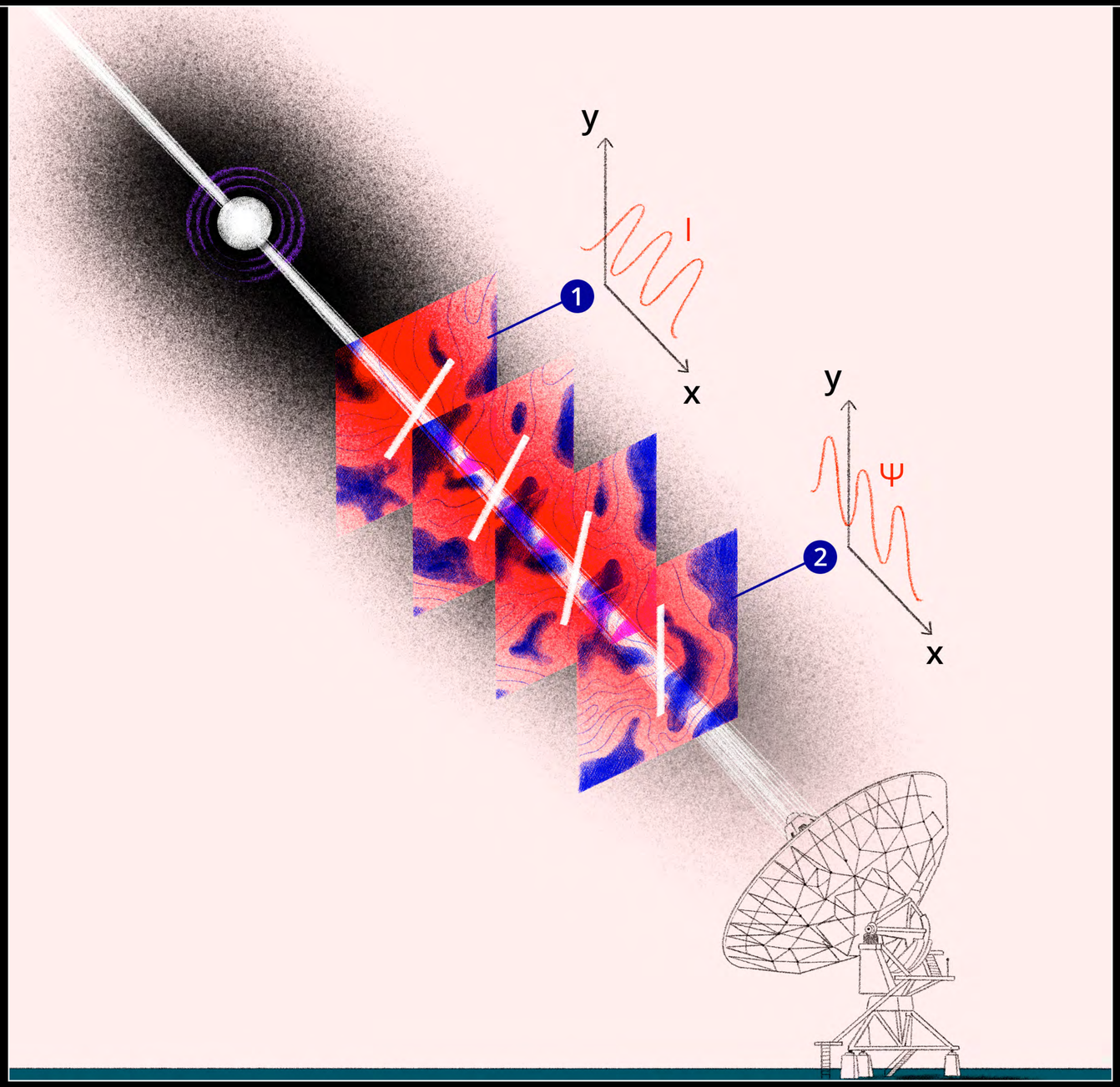
- visualisation of the birefringence of a pulsar’s polarised radio-wave emission induced by axion dark matter wave
- combining technical informations and a global illustrative view

Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

Illustrations for papers x J. M. Camalich, IAC, Spain

UNDARK



CONCEPT

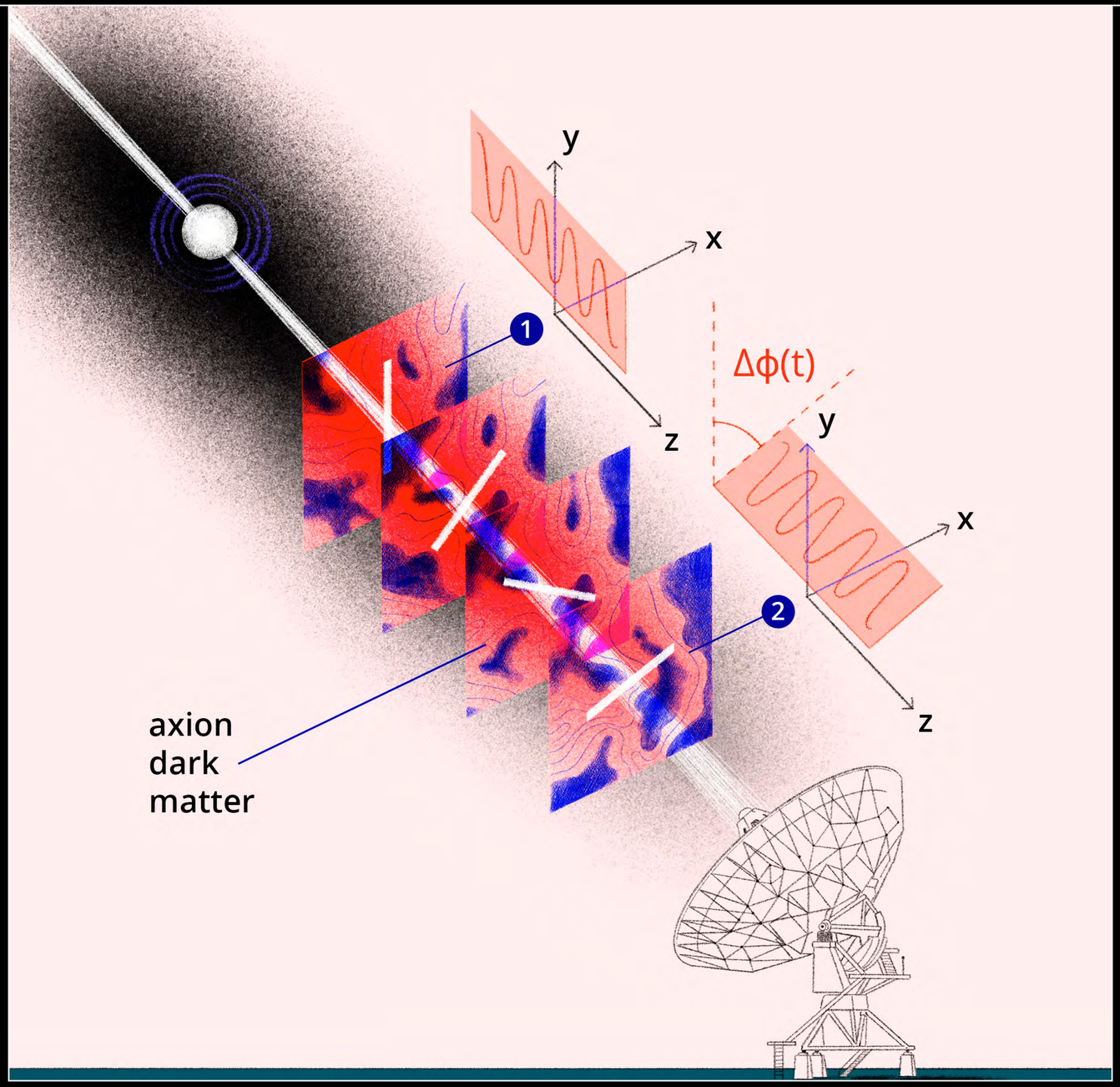
- visualisation of the birefringence of a pulsar’s polarised radio-wave emission induced by axion dark matter wave
- combining technical informations and a global illustrative view

Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

Illustrations for papers x J. M. Camalich, IAC, Spain

UNDARK



CONCEPT

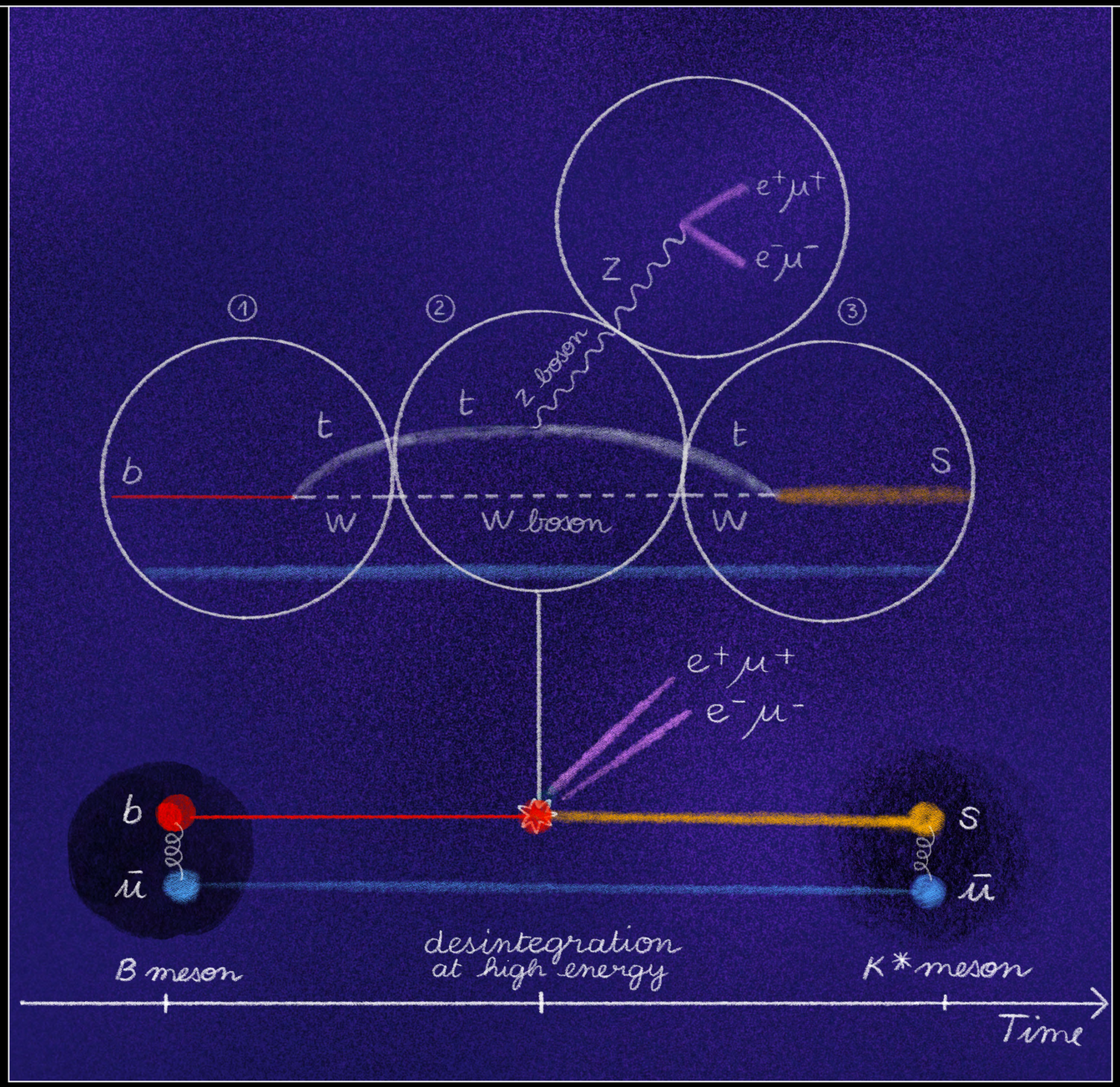
- visualisation of the birefringence of a pulsar’s polarised radio-wave emission induced by axion dark matter wave
- combining technical informations and a global illustrative view

Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

Illustrations for papers x J. M. Camalich, IAC, Spain

UNDARK



CONCEPT

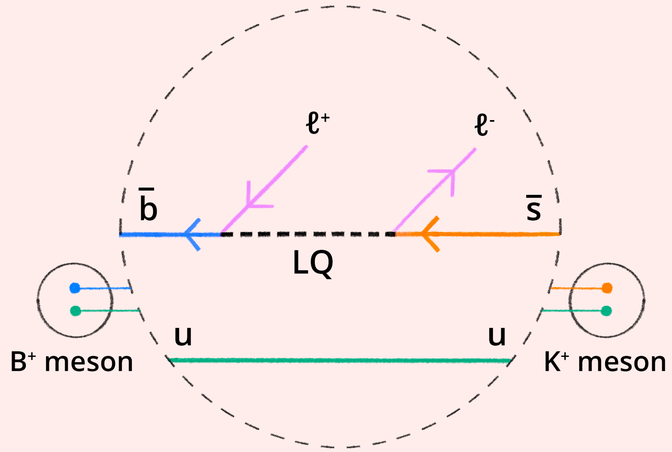
- lepton-Universality violation as measured by LHCb and induced by a super-heavy and exotic particle called the leptoquark
- another way to present Feynman diagrams

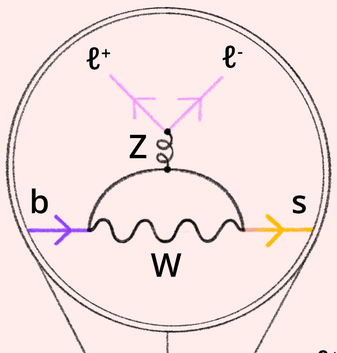
Ève Barlier — Instituto de Astrofísica de Canarias

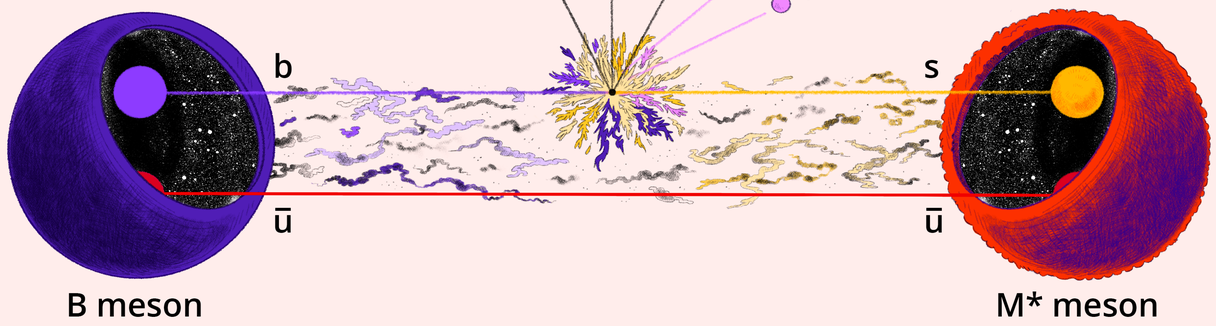
A portrait of the dark universe

Illustrations for papers x J. M. Camalich, IAC, Spain

UNDARK







CONCEPT

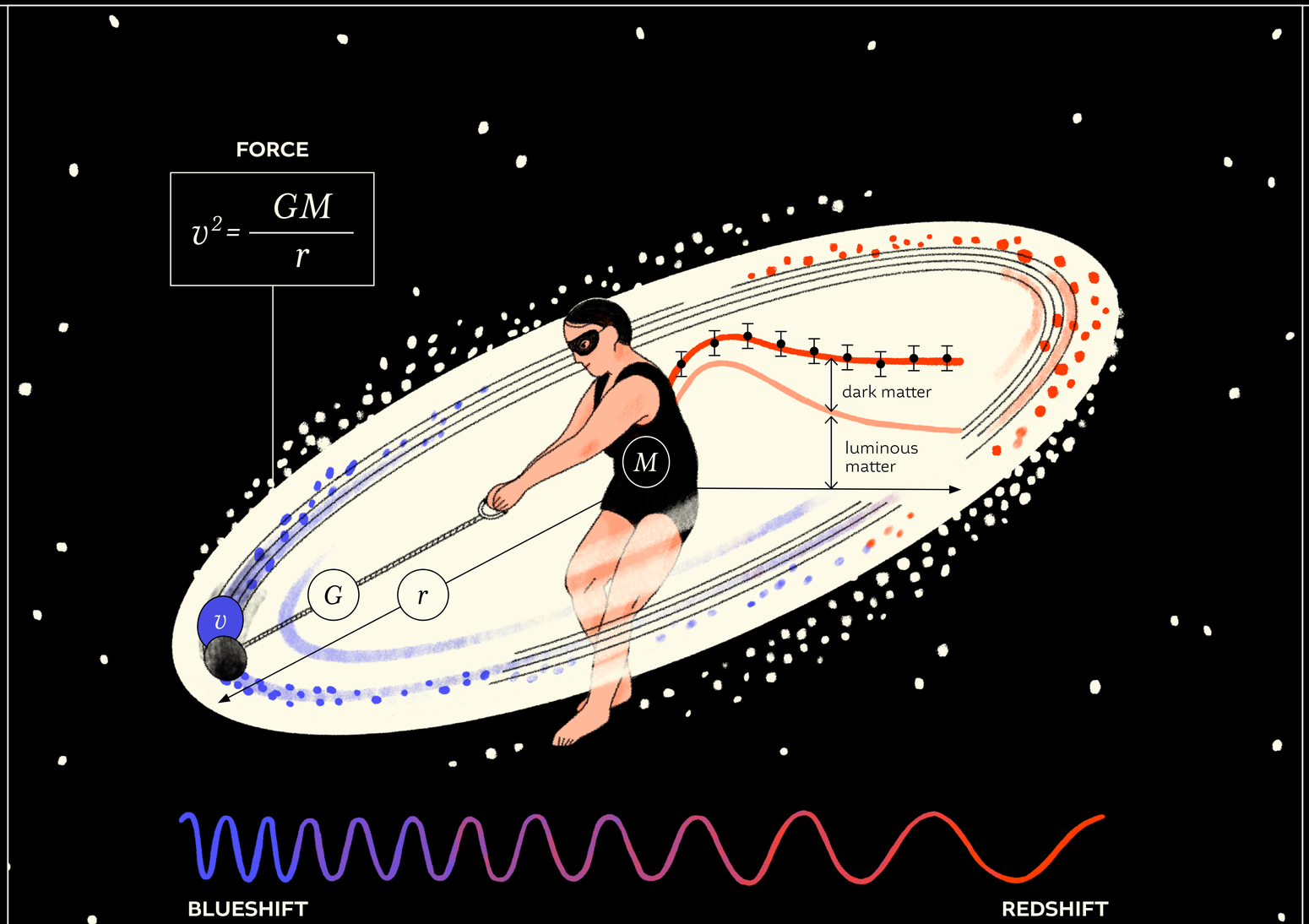
- lepton-Universality violation as measured by LHCb and induced by a super-heavy and exotic particle called the leptoquark
- another way to present Feynman diagrams

Ève Barlier — Instituto de Astrofísica de Canarias

A portrait of the dark universe

Teaching fundamentals of astronomy x J. M. Camalich, IAC, Spain

UNDARK

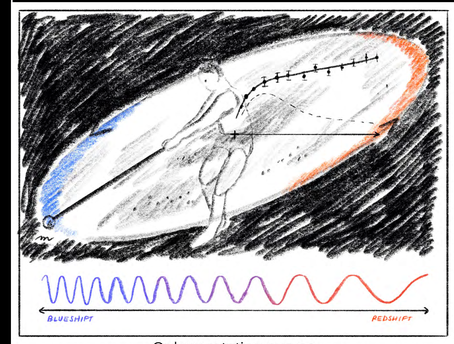


Galaxy Rotation Curves

Ève Barlier & Jorge Martín Camalich

CONCEPT

- a general educational illustration that can be used in various contexts
- summarising key notions



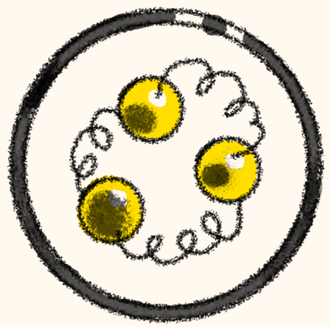
Galaxy rotation curves

Ève Barlier — Instituto de Astrofísica de Canarias

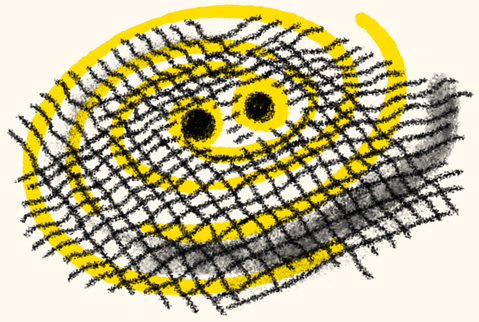
A portrait of the dark universe

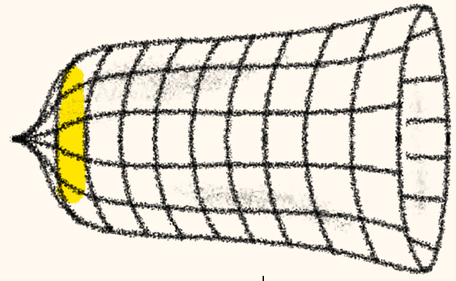
Leporelli five topics to explore

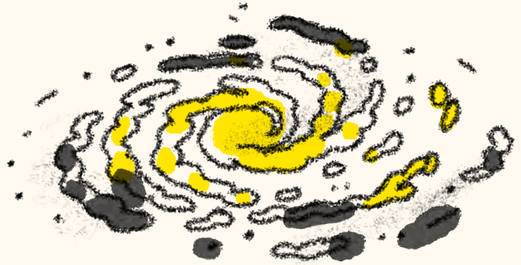
PARTICLES & STANDARD MODEL



GRAVITATIONAL WAVES







GALAXIES

STARS

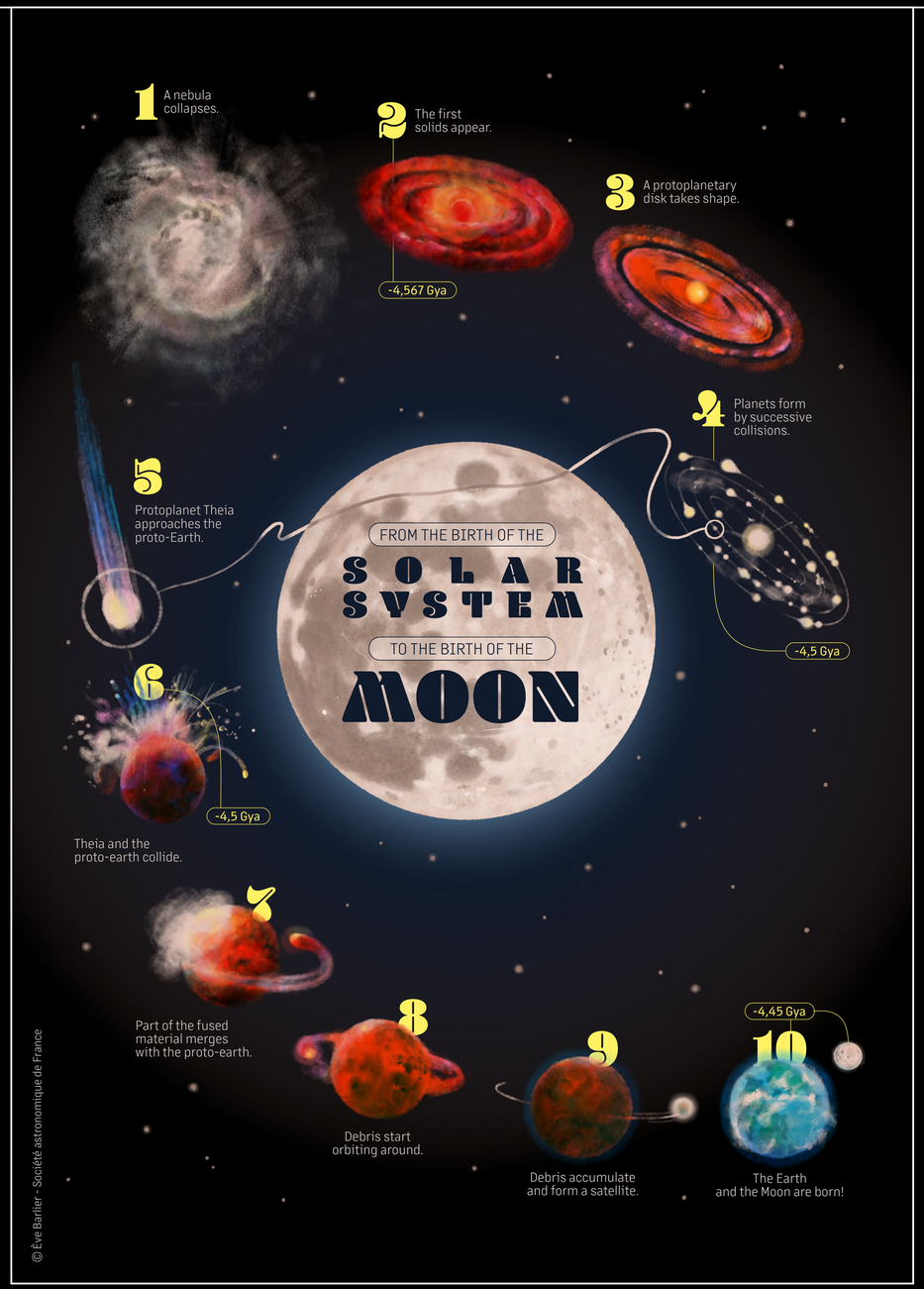
UNIVERSE

Ève Barlier — Instituto de Astrofísica de Canarias

Further art & science cocktails

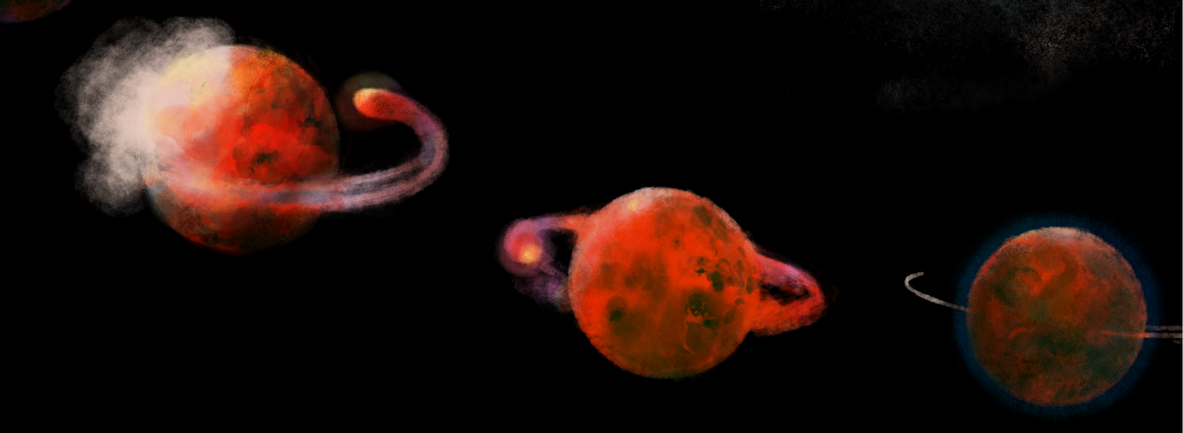
Poster for event On The Moon Again x French Astronomical Society (SAF)

UNDARK



CONCEPT

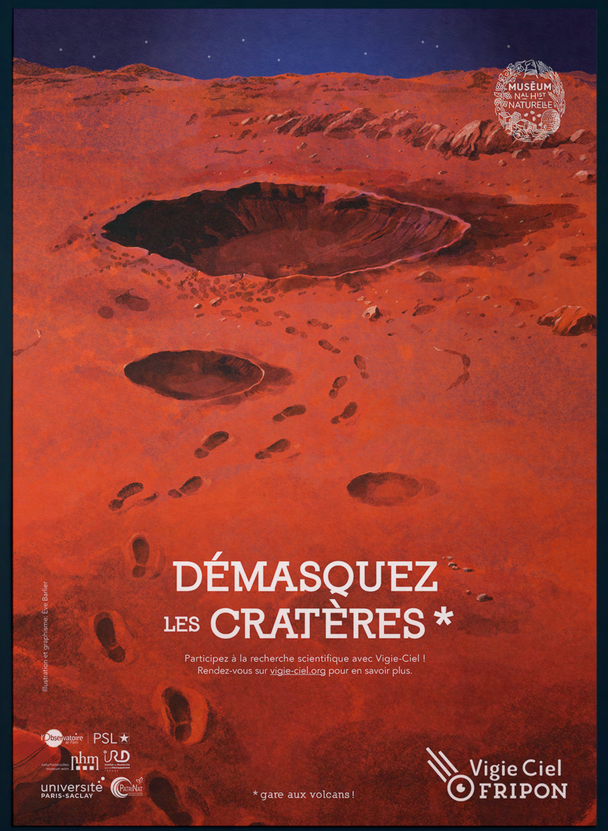
- a didactic poster to popularise Moon observation
- promoting a yearly event among citizens
- rewarding participants



Ève Barlier — Instituto de Astrofísica de Canarias

Further art & science cocktails

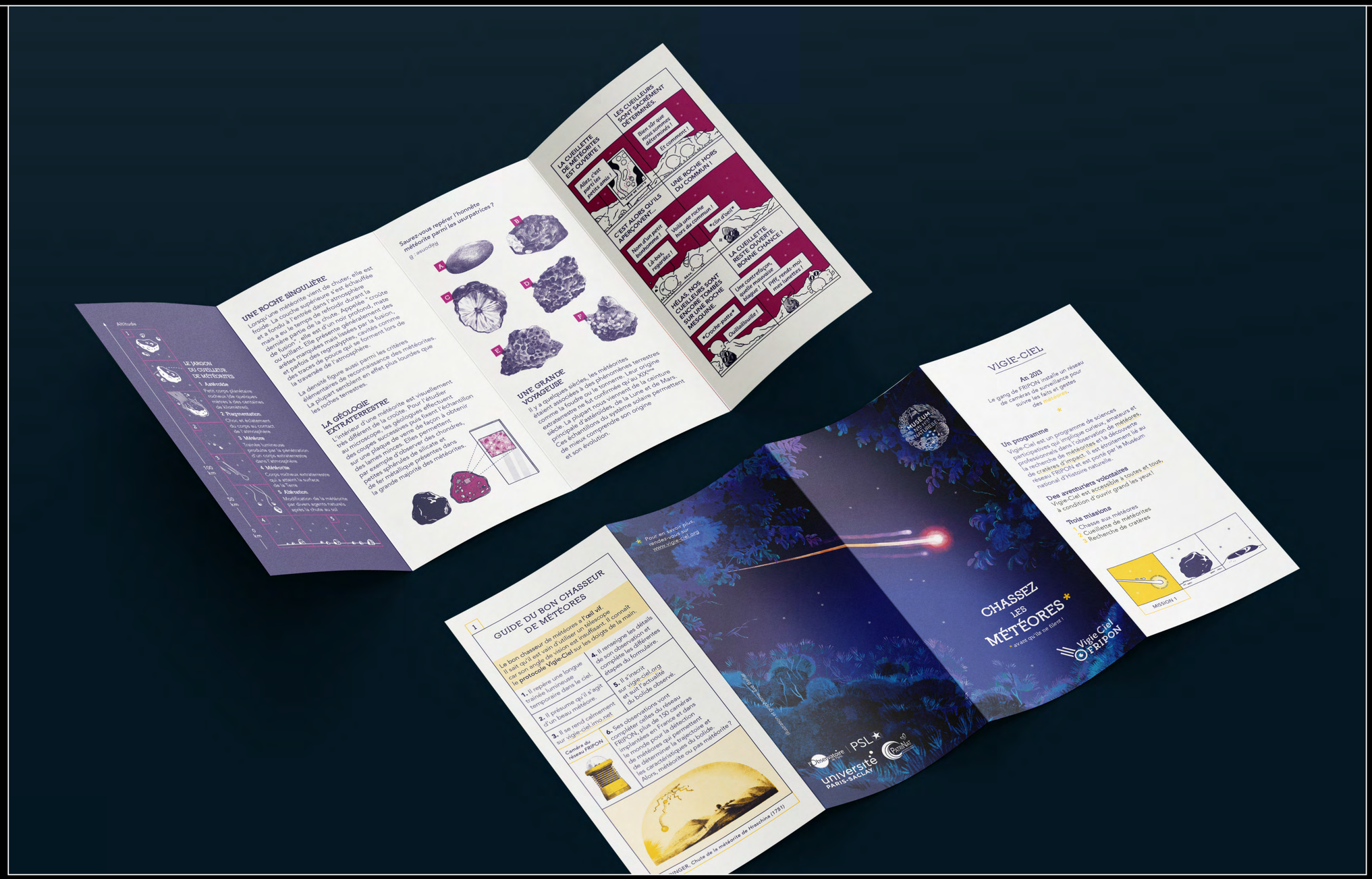
Citizen science posters x National Museum of Natural History (MNHN), France



Ève Barlier — Instituto de Astrofísica de Canarias

Further art & science cocktails

Citizen science posters x National Museum of Natural History (MNHN), France



Ève Barlier — Instituto de Astrofísica de Canarias


ANSELMO SOSA MÉNDEZ
MIGUEL MOLERO
JOSE BERMEJO
$f_{NL} = -5000$
$f_{NL} = 500$
"PENCIL JET"
"BRUSH JET"
JET SEGMENTS
DIMITRIOS KANTZAS
FREDERIC POIDEVIN
DWARF SPHEROIDAL
Not seen yet...
Antiprotons
RAQUEL FERNANDEZ HORCAJADA
Expl. energy
PASQUALE DARIO SERPICO
ALION FLUX
PIGION FLUX
RUBEN ZATINI
ANA BRANCO
JOSE ALBERTO RUBIÑO


THANK YOU!