

HERMES

MULTI-MESSENGERS OF THE EARTH AND OF THE UNIVERSE



Véronique Van Elewyck
Antoine Kouchner



Razvan Caracas,
Marc Chaussidon



Matthias Gonzalez

+ support from Eva Lancelin (IPGP) and many other colleagues

Earth sciences and astrophysics, data exploitation, **natural continuation** of UnivEarthS labex:

- Institut de Physique du Globe de Paris (IPGP UMR 7154, UAR 3454), with about 1/3 – 1/2 (?) of the researchers/professors staff involved.
- Laboratoire Astroparticule et Cosmologie (APC UMR 7164), with **about 3/4 of the staff involved (?)**, approximately 55 permanent researchers/professors.
- Department of Astrophysics at CEA (AIM UMR 7158), with all staff involved (?), 115 permanent researchers/professors.



WE ARE BUILDING HERMES NOW

Four big science questions:

How do Large Cosmological Structures Form?

origin of dark matter and dark energy (theo/obs ?) (APC)
cosmological structures (theo/obs ?) (APC)
star formation (AIM)

How do Astrophysical Sources Contribute to the Cosmic Ecosystem?

black hole mergers (theo/obs ?) (APC)
multi-scale signatures of cataclysms (theo/obs) (APC, AIM, IPGP ?)
accretion/ejection mechanisms (APC, AIM)

How do Planetary Systems Form and Evolve?

cosmic background for young planets (APC)
planetary formation and evolution (AIM, IPGP)
detection of exoplanets and analysis of data (AIM, IPGP)
early planetary environments (IPGP)

How Ecosystems Transform from Prebiotic to Biotic?

cosmic background for young planets (?) (APC)
planetary habitability (IPGP)
atmospheric conditions (AIM)



**Large
Cosmological
Structures**

**Astrophysical
Sources**

**Planetary
Systems**

**Prebiotic
to Biotic**

3 types of contributions from pairs of laboratories

Astrophysics

(APC + AIM)

Gravitational Wave &
Cosmic Phenomena
Observations

Galaxy Formation &
Cosmology

Exoplanets

(IPGP + AIM)

Atmospheric Studies of
Exoplanets

Planetary Formation &
Dynamic Processes

Composition of Meteorites

Earth and Solar System

(APC + IPGP)

Deep Earth & **Lunar
Geophysics**

Primitive Matter

**Large
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to Biotic**

Individual contributions from each laboratory

Cosmic Structures

(AIM)

Hierarchy of cosmic structures

Multi-wavelength detection

Formation of stars and planets

Dark

(APC)

Detection of dark energy

Detection of dark matter

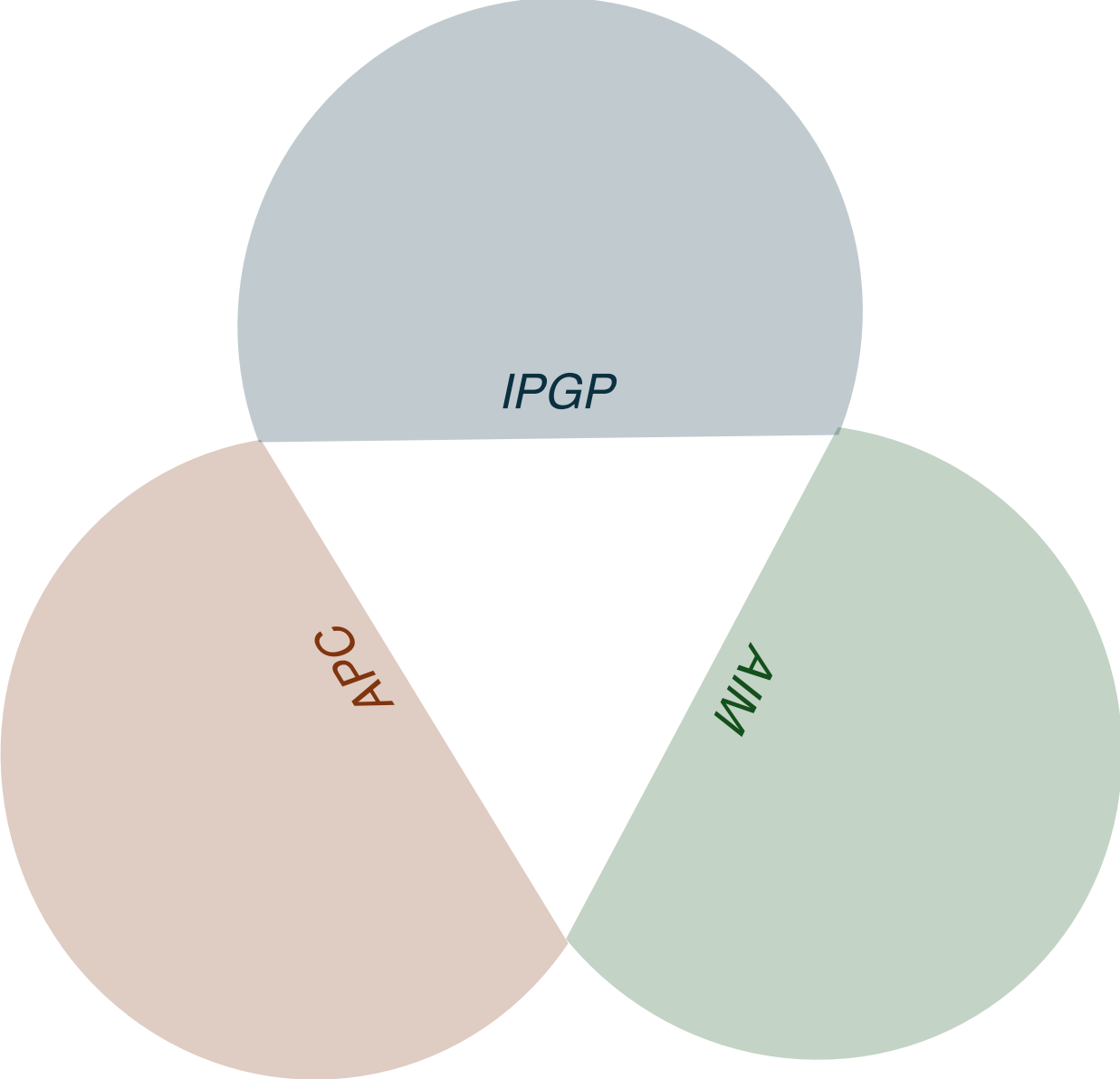
Early Earth and Solar System

(IPGP)

Accretion

Early Earth geology

Extreme Environments



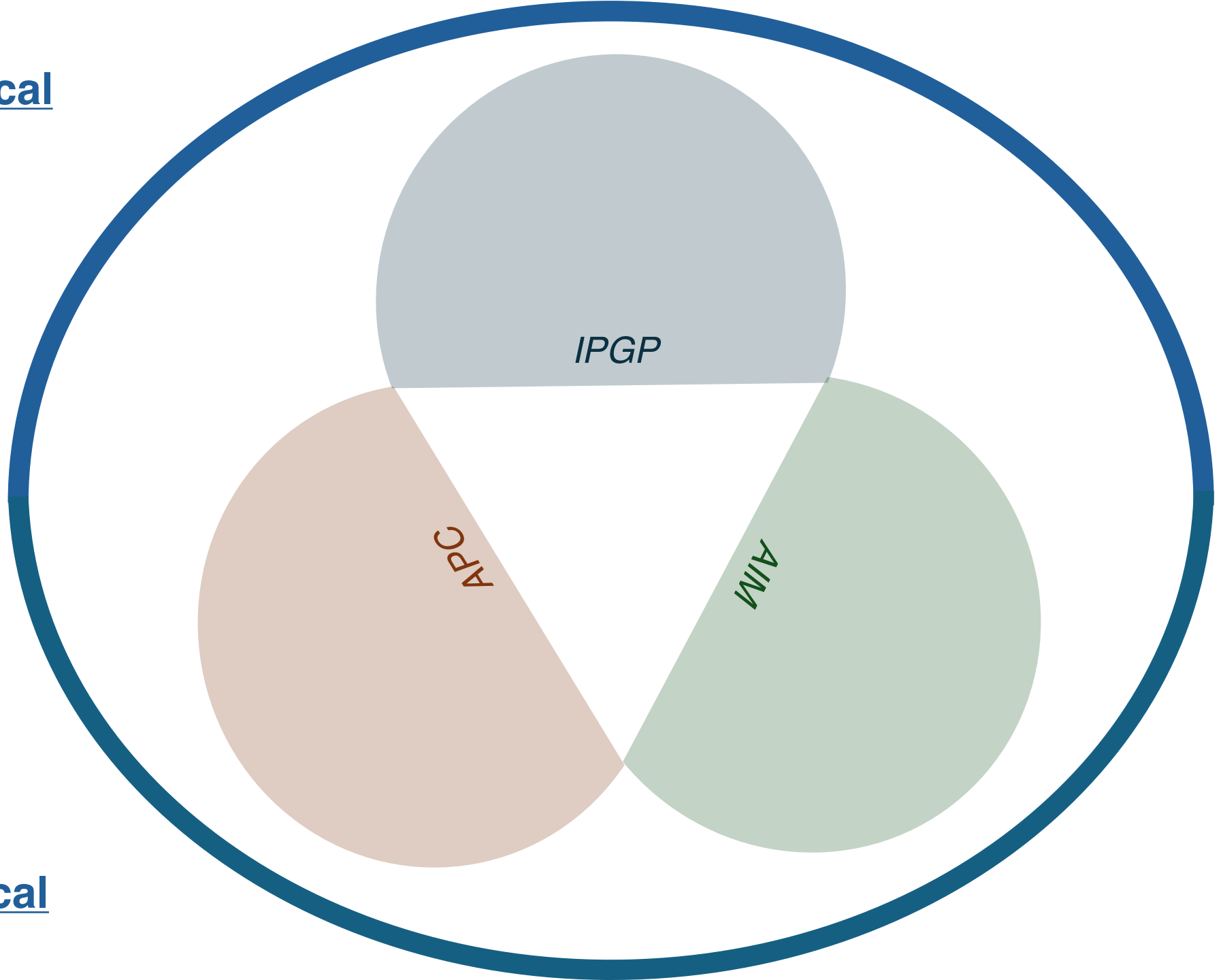
IPGP

APC

AIM

Large
Cosmological
Structures

Planetary
Systems

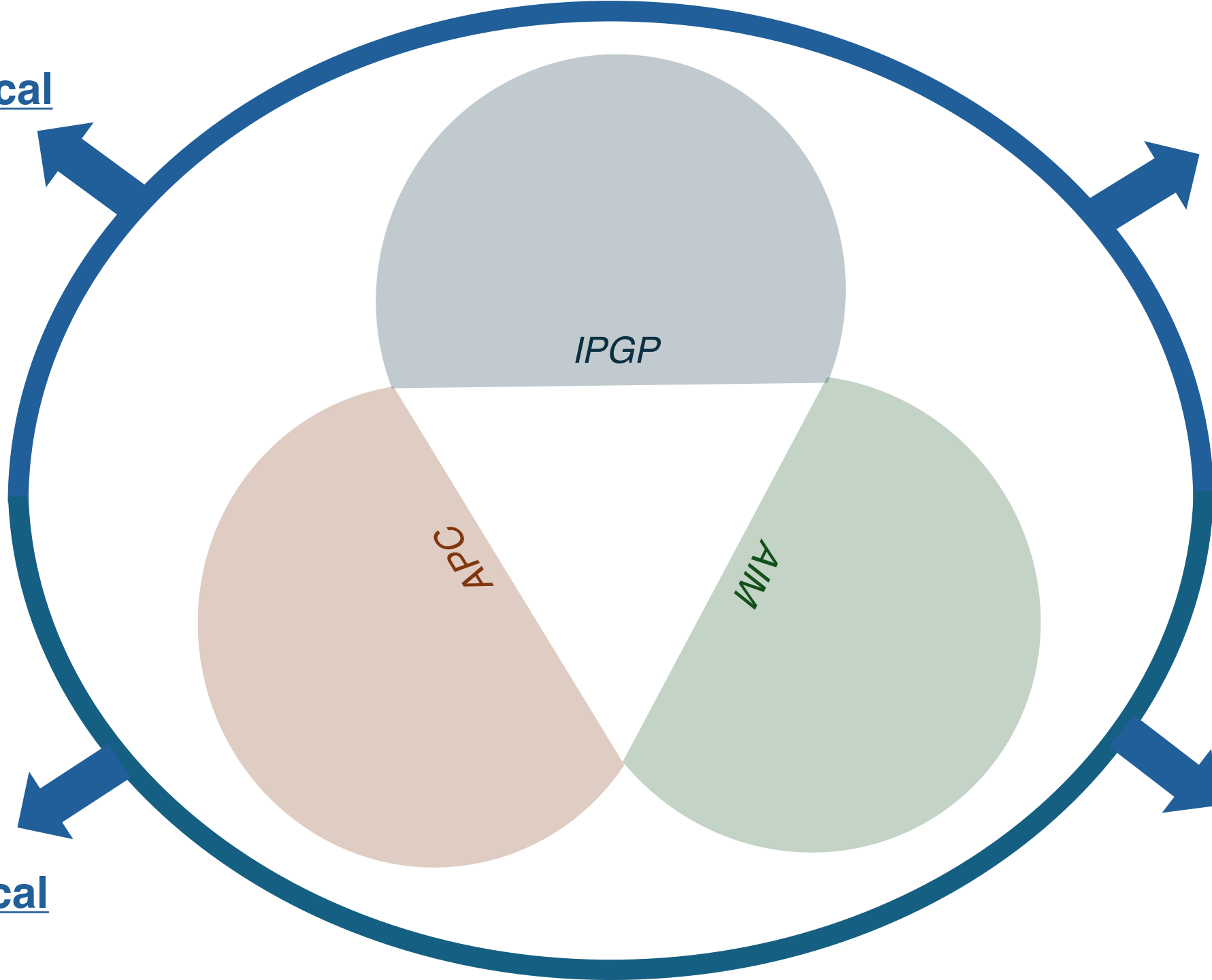


Astrophysical
Sources

Prebiotic
to
Biotic

Large
Cosmological
Structures

Planetary
Systems



IPGP

APC

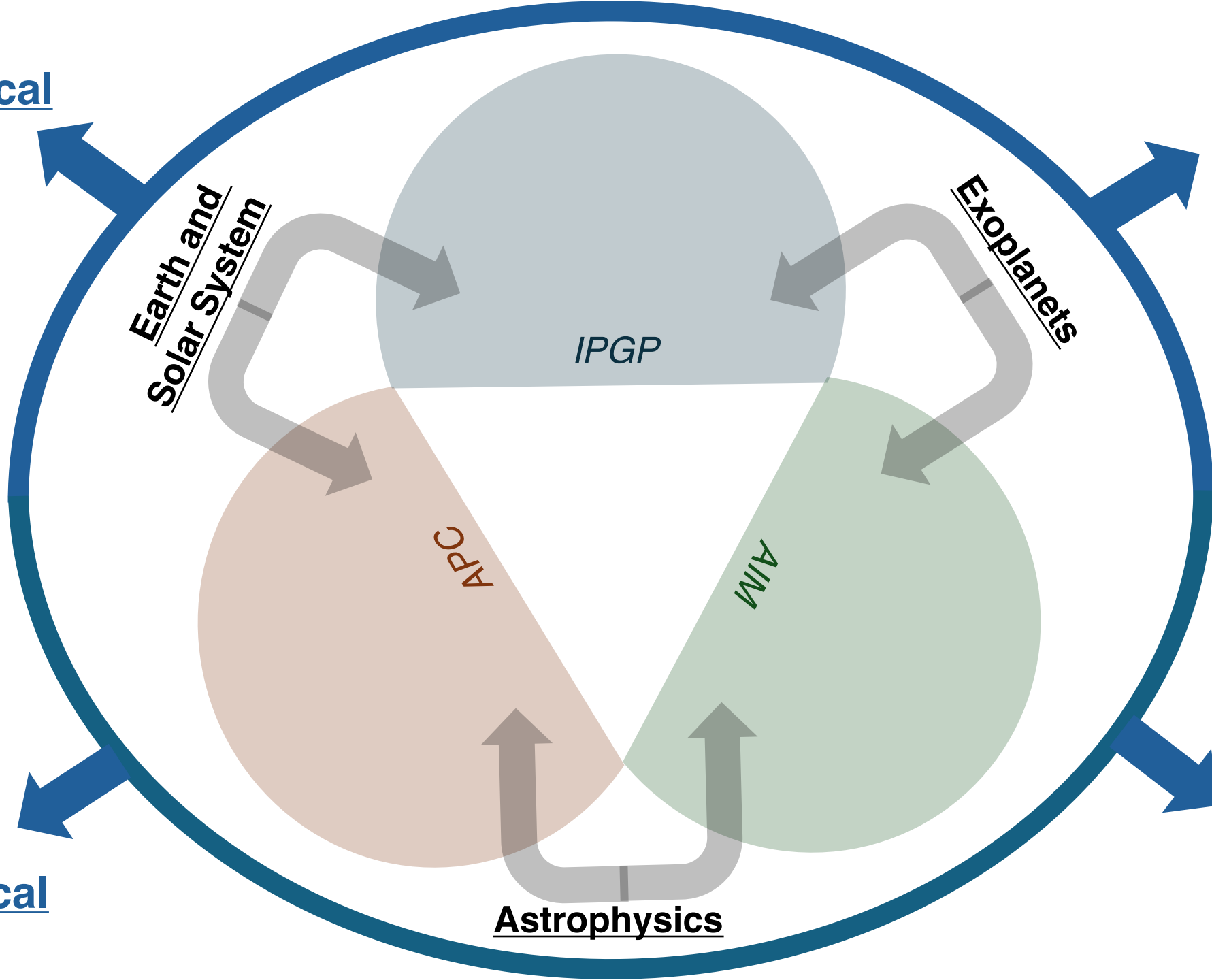
AIM

Astrophysical
Sources

Prebiotic
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Large
Cosmological
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Earth and
Solar System

Exoplanets

IPGP

APC

AIM

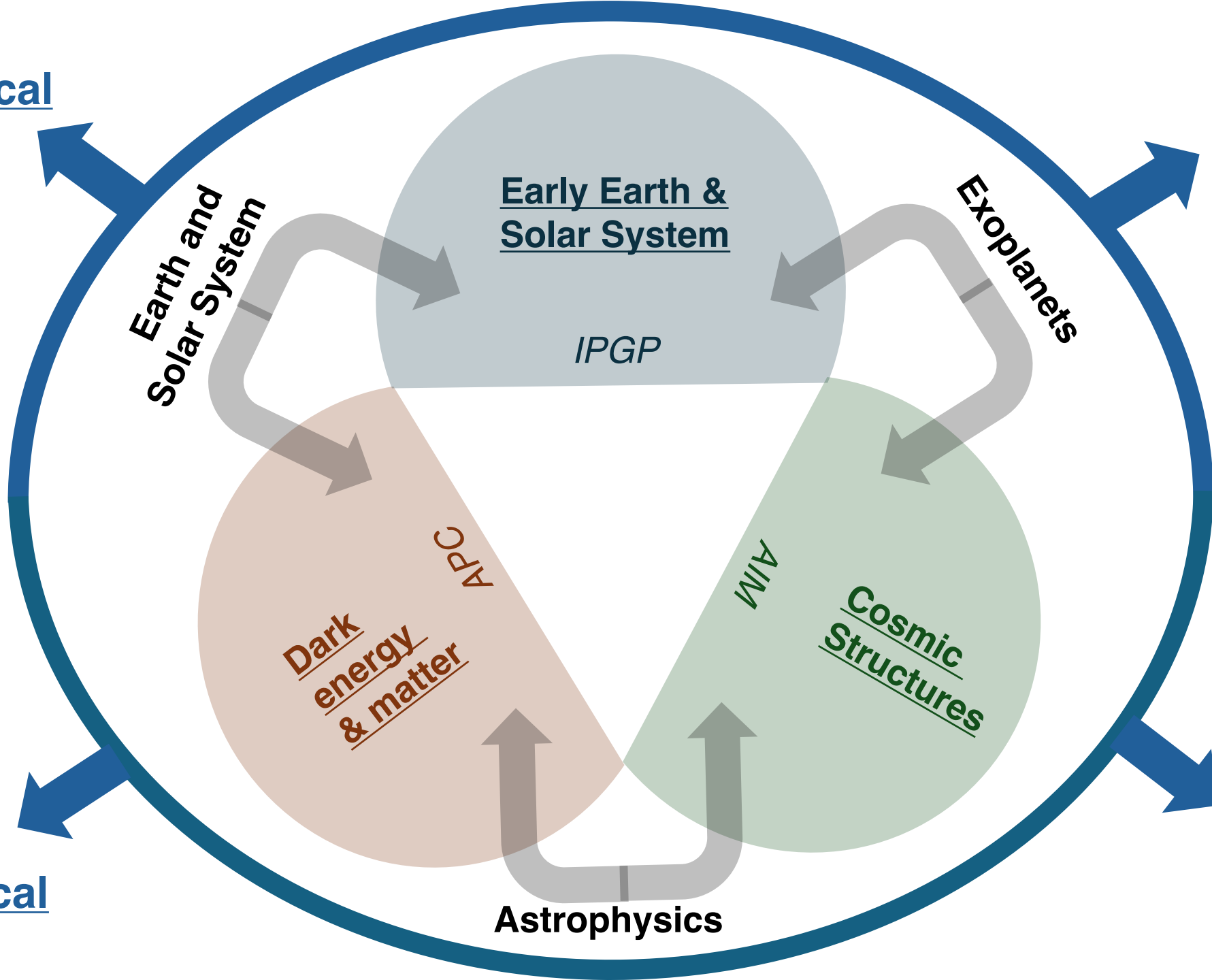
Astrophysics

Astrophysical
Sources

Prebiotic
to
Biotic

Large
Cosmological
Structures

Planetary
Systems



Earth and
Solar System

Exoplanets

Dark
energy
& matter
APC

Cosmic
Structures
AIM

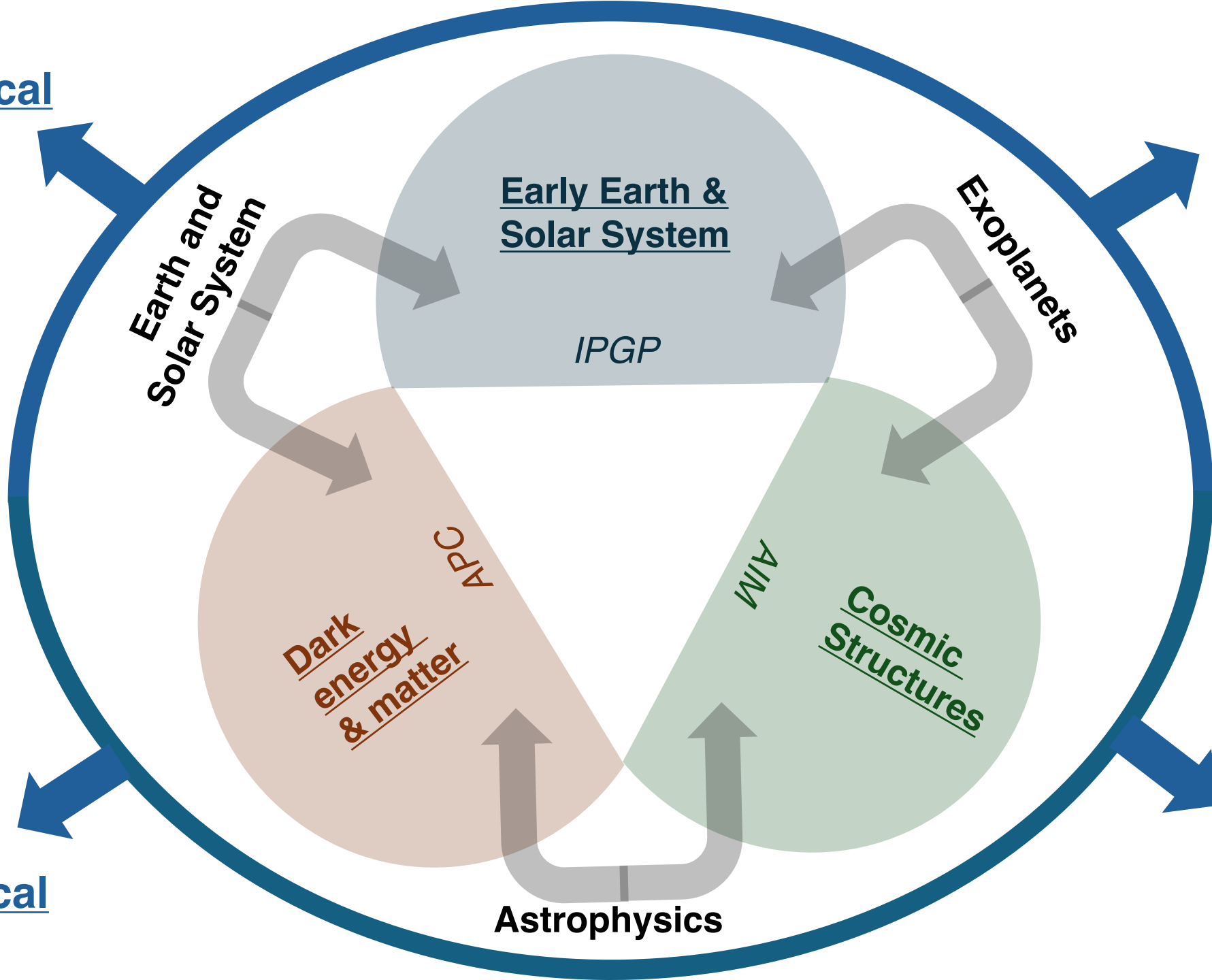
Astrophysics

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Astrophysical
Sources

Prebiotic
to
Biotic

BUDGET

calculation items	Année 1	Année 2	Année 3	Année 4	Année 5	Année 6
eng	1	1	1	1	1	1
PhD	6	6	6+4	4+4	4+4	4
suport these	6	6	10	8	8	4
postdoc	6	6	4	4	5	5
support postdoc	6	6	4	4	5	5
ecoles	4	4	0	5	2	10
consommables	1	1	1	4	1	4

SUMMARIZE:

3 labs (IPGP, AIM, APC)

Questions:

How do Large Cosmological Structures Form?

How do Astrophysical Sources Contribute to the Cosmic Ecosystem?

How do Planetary Systems Form and Evolve?

How Ecosystems Transform from Prebiotic to Biotic? 900 kEuros x 6 years

Attract and enhance collaborations with external partners, like within UPC, Inst. Pasteur, CircleU, etc.

We need the list of personnel

IMPORTANT: UNIQUE LABEX MEMBERSHIP (maybe best is to split the teams between projects)