

Imperatives for an exoplanet WP

- Philosophy:

Final goal: search for **validated** biosignatures.

This goal is outside L2 (and L3?)

L2 goal: prepare the consolidation of future biosignature **candidates**, i.e. deep understanding of exoplanet physics

- Content:

- Be innovative (compared to M3 proposals)
- Be federative

- To do: First priorities

Be innovative

- Science
- Mission concepts

Be innovative

- **Science:**

Go beyond basic parameters (mass, molecular content, temperature, planet radius, clouds...)

Examples:

- Temporal variations (diurnal [planet rotation], climatic, correlation to stellar variations, ...)
- New objects: dust swarm around planets (cf Fomalhaut), exo-comets, exo-moons, rings

Be innovative

- **Mission concepts** Several possibilities, from zero-risk to very prospective:
 - Spectroscopy of transits
 - Astrometry
 - Spectro-polarimetric direct imaging of reflected light (coronagraphy)
 - More prospective (with possible international collaboration):
 - Astrometry + coronagraphy (Guyon)
 - Imaging of transits (Stellar Imager-like) == > high SNR for spectroscopy
 - Spectro-imaging of thermal emission (interferometer + nulling)
 - Combination of coronagraphy and “Pegase-like” : reflected light AND thermal emission: modular mission, built step by step: first coronagraph, addition of “Pegase” wings for a small, robust interferometer
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Be federative

Advocate for planet physical characterization (bulk properties [mass, radius], atmosphere and surface characteristics).

Leave open the choice for a mission concept, depending on future technological progress

The goal is to have the exoplanet theme selected.

To do first

For two or three mission concepts:

Number of targets as a function of

- SNR
- R_{planet}
- a_{planet}
- M_{planet}
- Spectral resolution
- Spectral range
- Observable (molecules etc)
- Instrument parameters (size...)

Identify a small group for this task: Dumusque (HARPS), Malbet?, Léger? Transit person, direct imaging person

WP sections

- Why exoplanets: THE science of the whole 21st century
- Present situation (from now to 2025):
 - Results
 - Projects
- Scientific goals for L2/L3:
 - Planet physics (be innovative)
 - Observables
 - SNR
 - Targets
- 2 or 3 missions concepts

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 - Targets
- 2 or 3 missions concepts

Open discussion: do not speak all together!