

Toward a European UV coronagraph instrument on the Habitable World Observatory: the attractive French expertise

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The Habitable Worlds Observatory (HWO) is a large (~6-8m) infrared/optical/ultraviolet space telescope recommended by the NASA Decadal Survey on Astronomy & Astrophysics 2020. In addition to providing transformational astrophysics discoveries from our closest neighborhood to the distant universe, it is aimed to be the first telescope to specifically search for signs of life on planets orbiting other stars. Indeed, its coronagraph instruments would directly image and characterize at least 25 potential Earth-like exoplanets in the habitable zone of their host stars.

The major challenge of exoEarth characterization could be achieved through a UV coronagraph. Indeed, the near-ultraviolet (NUV) wavelength range contains a valuable Ozone absorption band whose detection is the most significant marker of photosynthesis over a large range of planet's lifetime. However, such a detection requires extremely ambitious instrument performance while UV coronagraph concepts highlight the many technological challenges and have never been demonstrated in-lab.

The French astrophysics community possesses the relevant expertise in both coronagraphs and UV technologies to increase the Technology Readiness Level of designs and components required to onboard such an instrument on HWO. In this presentation, I will describe the difficulties of obtaining high-contrast performances in the UV and the turnarounds toward the first in-lab demonstration of such a coronagraph. This essential instrument could represent a major European/French contribution to HWO.