Ultra High Precision Astrometry with the Habitable Worlds Observatory

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Abstract

The Habitable Worlds Observatory (HWO) is a large infrared/optical/ultraviolet space telescope recommended by the National Academies' 2020 Decadal Survey. HWO will be the first telescope designed specifically to search for signs of life on planets orbiting other stars. It will notionally be a _˜6m aperture telescope sensitive in the UV through NIR. With the proper instrumentation, HWO will also be NASA's next great general observatory, capable of a broad range of science serving the entire astrophysics community. Given its high angular resolution and large collecting area, HWO has the potential of obtaining extremely high-precision (< 10 microarcsec) narrow-angle astrometry on bright sources, provided that enough reference stars are available and detector systematics can be controlled to the appropriate level. I review some of the science applications of this capability, and then focus on the technological challenges of realizing this potential.

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