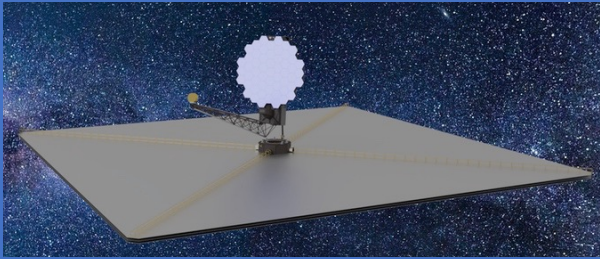


Participation to NASA Habitable Worlds Observatory

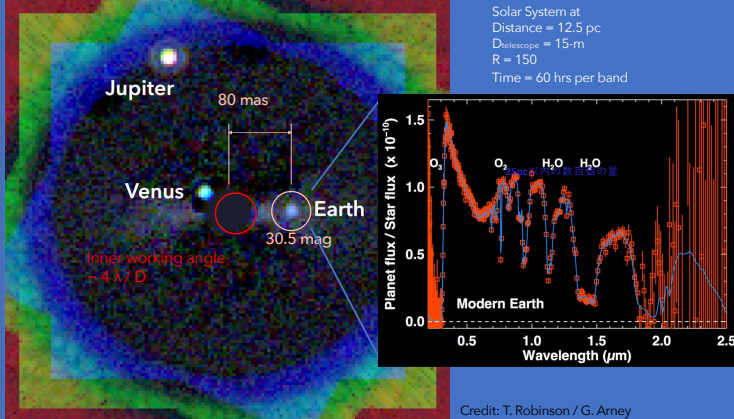
T. Sumi, K. Masuda (Osaka U.), S. Miyazaki, K. Motohara, M. Ouchi, Y. Matsuda, J. Nishikawa(NAOJ), M. Tamura (ABC/Tokyo U.), S. Kameda (Rikkyo U.), G. Murakami, T. Yamada, K. Enya(JAXA), T. Matsuo, S. Itoh (Nagoya U.), N. Murakami N (Hokkaido U.), T. Kodama, M. Tanaka, (Tohoku U.) K. Tsumura (Tokyo City U.), A. Inoue (Waseda), N. Narita, I. Sakon (Tokyo U.), N. Suzuki (LBL) and HWO-J team

Habitable Worlds Observatory (HWO) is a next NASA flagship mission, as recommended by the 2020 Astrophysics Decadal Survey, to be **Launched at first half of 2040's**. HWO would search for potentially **habitable planets** and search for **biosignatures** from **~25 habitable zone planets** beyond our solar system and conduct **general astrophysics**.

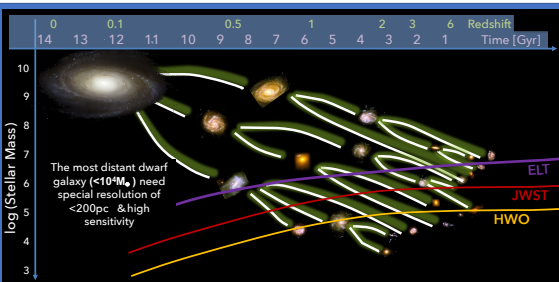


- **off-axis inscribed diameter 6-m,**
- **Segmented,** deployable far FUV/optical/NIR telescope (100 nm to 2500 nm)
- **Ultra-stable** to enable **high performance coronagraphy**
- **Serviceable & upgradable** (25 year lifetime goal for non-serviceable comp.)

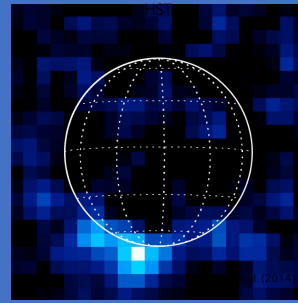
Simulated Direct imaging and spectroscopy by coronagraph



- Estimate **frequency of habitable exo-Earth**
- search for **biosignatures** by spectroscopic observation of **reflected** light from **~25 habitable zone exo-Earth** around **Solar type star**



- Resolving the **smallest structures** in the early universe to understand the **formation process of galaxies** with unprecedented spatial resolution & sensitivity.



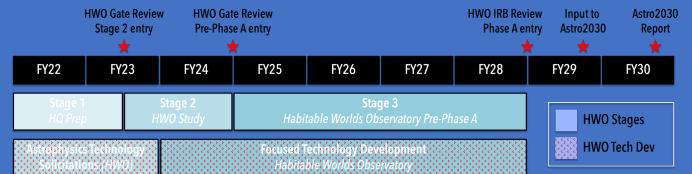
Europa in far-UV Lyman- α emission



Input model: G. Ballester

- Monitoring the intensity and frequency of **plumes** emanating from the inner oceans of ice satellites with a spatial resolution as high as that of a space probe to investigate the possibility of **habitability of life on ice satellites** in the solar system.

- **Great Observatories Maturation Program (GOMAP)** provide **early investment** in the development of multiple mission concepts to lower the risks and costs of projects before they become too complex, large, and costly.
- Currently, step 2 of GOMAP, **Science, Technology, Architecture Review Team (START)** just started



Japanese community is promoting to participate to HWO by contributing to the hardware with key technologies

- **One-Dimensional Diffraction-Limit Coronagraph+ Fiber Nulling**
- **Highly stable spectrograph**
- **funnel-type MCP, UV coating**
- **Broadband coronagraphic masks**
- **Optical module for multi-wavelength dark holes**

all interested parties are welcome to join