

Current status of WSO-UV/UVSPEX for discovery of Earth-like planets

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The World Space Observatory for Ultraviolet (WSO-UV) is an orbital optical telescope with a 1.7-m diameter primary mirror currently under development. The WSO-UV is aimed to operate in the 115- to 310-nm UV spectral range. Its two major science instruments are UV spectrographs and UV imaging field cameras with filter wheels. The WSO-UV project is currently in the implementation phase, with a tentative launch date in 2023. As designed, the telescope field of view in the focal plane is not fully occupied by instruments. Recently, two additional instruments devoted to exoplanets have been proposed for WSO-UV, which are the focus of this paper. UVSPEX, a UV-spectrograph for exoplanets, aims to determine atomic hydrogen and oxygen abundance in the exospheres of terrestrial exoplanets. The spectral range is 115 to 130 nm, which enables simultaneous measurement of hydrogen and oxygen emission intensities during an exoplanet transit. A study of exosphere transit photometric curves can help differentiate among different types of rocky planets. The exospheric temperature of an Earth-like planet is much higher than that of a Venus-like planet because of the low mixing ratio of the dominant coolant (CO₂) in the upper atmosphere of the former, which causes a large difference in transit depth at the oxygen emission line. Thus, whether the terrestrial exoplanet is Earth-like, Venus-like, or other can be determined.

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