

Transmission Spectroscopy of the Earth-Sun System to Inform the Search for Extrasolar Life

If Earth were an exoplanet, could we tell whether or not it's habitable?

This is the fundamental question that an Earth transit observation mission would seek to answer, by sending a near-ultraviolet to near-infrared spectrometer past the Earth-Sun L2 point, to observe transits of the Earth across the Sun as if it were an exoplanet.

A spacecraft with broad wavelength coverage (e.g., 0.25-2.5 μm) would be sensitive to standard habitability indicators (H_2O , CO_2) and biosignature pairs (O_2 & CH_4 , O_3 & CH_4) that JWST will search for in M-dwarf planet atmospheres.

Habitable ExoLagrangian Instrument Explorer

A mission capable of observing Earth transiting the Sun can evaluate whether the transit technique is effective for detecting signs of habitability and life

