The Keck Institute for Space Studies
and The Planetary Society
present a public lecture:

Magnifying Light by 100,000,000,000 with the Solar Gravity Lens to Image an Exoplanet

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4:30 PM Refreshments
5:00 PM Lecture

Lees-Kubota Lecture Hall
Guggenheim Building
California Institute of Technology

Nature has presented us with a very powerful "instrument" that we have yet to explore and learn to use. This instrument is the Solar Gravitational Lens (SGL), which results from the ability of the gravity field of the Sun to focus light from faint, distant targets. In the near future, a modest telescope could operate on the focal line of the SGL which begins 547 AU in the far outer solar system. Using the enormous magnification power of the Lens would enable high-resolution images and spectroscopy of a habitable exoplanet.

We discuss the imaging properties of the SGL, when the image occupies many pixels in the region near the optical axis. We discuss a mission to the SGL focal region that could provide us with direct, multi-pixel, high-resolution images and spectroscopy of a potentially habitable Earth-like exoplanet. Based on our initial studies, we find that such a mission could produce (1,000×1,000) pixels images of "Earth 2.0" at distances up to 30pc with spatial resolution of ~10 km on its surface, enough to see its surface features. We address some aspects of mission design and spacecraft requirements, as well as capabilities needed to fly this mission in the next two decades.