

**Space Science Seminar  
Tuesday, 2018 August 14  
10:30 a.m.  
NSSTC/2096**

**Magnifying Light by 100 Billion Times with the  
Solar Gravitational Lens for Direct Imaging of  
an Exoplanet**

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Host: Reginald Alexander (Sponsored by ST03)

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 gravitational field of the Sun to focus light from faint, distant targets. In the near future, a modest telescope with a solar coronagraph could operate on the focal line of the SGL and, by using the enormous magnifying power of the Lens, could provide high-resolution images and spectroscopy of a habitable exoplanet. We discuss the imaging properties of the SGL, when the image of an exo-Earth occupies many pixels in the region near the focal line. 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 100 light years 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.

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