

Nulling Interferometry for Extra-solar Planet Detection:
Sensitivity & Image Reconstruction

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A typical star is more than a billion (in optical) to a million (in infrared) times brighter than the planet, making the planet undetectable in the star's glare without special efforts to suppress the starlight. Nulling interferometers operating in 1AU orbit with four 3.5-m telescopes can detect Earth-like planets at distances as far as 15 pc and characterize their atmospheric emission for biosignatures. Images of planetary systems are not formed by direct imaging, but are reconstructed after measurements have been made with the array in multiple orientations and configurations. This paper addresses the image reconstruction issues for nulling interferometer arrays and the sensitivities for planet detection. We also discuss the use of smaller versions of the nulling interferometers capable of imaging and characterizing the jovian planets detected around nearby stars by radial velocity techniques.