

Planet Detection with SIM in Narrow Angle Mode

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Abstract

The Space Interferometry Mission (SIM) will measure astrometric reflex motions of stars to unprecedented precision. This will make possible detection and characterization of the orbits of subJupiter-mass planetary companions around nearby solar-type stars.

We report results of simulation of planet detection by the SIM instrument. We consider ensembles of stars observed in narrow-angle mode. Each star may have one or more companions. For various signal strengths, we determine (from analysis of a time series of simulated differential delay measurements over a five year observing campaign) the confidence level at which we can state that a companion exists. We determine threshold signal strength at which it is possible to identify the orbital periods present in the system and assign each companion unambiguously to its proper parent star. We determine threshold signal strengths at which it is possible to determine orbit parameters such as inclination, semi-major axis and period of each companion.

These results are preliminary in nature and not to be taken as final description of the capability of the SIM instrument.

KEY WORDS: Space Interferometry Mission (SIM), Planet search, astrometry