

P41b **Determine of masses and periods of exoplanets at long orbits by Radial Velocity, Astrometry and Direct Imaging**

松尾太郎 (JPL、大阪大) Wesley A. Traub (JPL) and SIM team

Since the first detection of exoplanets orbiting around normal stars in 1995, more than 300 exoplanets (candidates) have so far been detected. However, we still know very little about the planetary constituents in the outer regions (5-100AU) and the planetary formation process around early-type stars or “ young ” stars (<1 Gyr) due to selection effect of the radial velocity method. However, the astrometric search and direct imaging are the best ways to investigate around the early-type stars or the young stars.

Here we propose two new science studies, combining of the current methods: To reveal a relation between color mass determined from direct imaging surveys and dynamical mass determined from the astrometric observations, and to accurately determine the masses and periods of the planets at long orbits by the combination of the radial velocity and the astrometric methods.

As the first step, we derived statistical behaviors for the astrometric and the radial velocity planet detections. We found that, in the both cases of the astrometric and the radial velocity detections, the mass error begins deteriorating due to nuisance parameters when the ratio of the periods to the duration of the experiment, P/T , is less than 1. In this presentation, we introduce the new science studies.