

CESO: A concept for direct imaging of extrasolar Earth-like planets from the ground

Markus Janson (janson at mpia.de), MPIA Heidelberg

We present a new concept for detecting and characterizing extrasolar planets down to Earth-size or smaller through direct imaging. The NWO occulter developed by Cash and coworkers is placed in a particular geometrical setup, where fuel requirements are small, and where the occulter is used in combination with ground-based telescopes, presumably leading to an extreme cost efficiency compared to other concepts with similar science goals. We investigate the various aspects of the given geometry, such as the dynamics and radiation environment of the occulter, and construct a detailed example target list to ensure that an excellent science case can be maintained despite the limited sky coverage. It is found that more than 200 systems can be observed with 2-3 visits per system, using only a few tonnes of fuel. For each system, an Earth-sized planet with Earth albedo can be found in the habitable zone in less than 2 hours.