IAA-00-IAA.9.1.10

PROSPECTS FOR THE DETECTION OF EARTHS ORBITING OTHER STARS

William J. Borucki[1], David G. Koch[1], Jack J. Lissauer[1], Edward W. Dunham[2], Jon M. Jenkins[3], and Fred Witteborn[4]

1. NASA Ames Research Center, Moffett Field, California, USA; 2. Lowell Observatory, Flagstaff, Arizona, USA; 3. SETI Institute, Moffett Field, California, USA, 4. Orbital Science Corp., Moffett Field, California, USA

Extrasolar planets have been detected by timing the radio signals from millisecond pulsars, from Doppler velocity changes in the spectra of main sequence stars, and most recently by the white-light transit of HD209458. Detection of Earth-sized planets in and near the habitable zone of main-sequence stars appears to be extremely difficult, if not impossible, from ground-based observatories because of noise introduced by scintillation and transparency changes in the Earth's atmosphere. To overcome these difficulties, several spaceborne photometric missions have been proposed. The COROT mission is a CNES/ESA mission with a 30 cm aperture telescope that will monitor each of several star fields for five months to find short period planets. The Kepler project is a USA effort designed to monitor 100,000 solar-like stars in a single field of view for a period of four years. The long duration enables the reliable detection of planets with orbital periods from a few days to as long as two years. Thus it should be able to determine the frequency of planets in and near the habitable zone and associate them with stellar spectral types. Canadian and Scandinavian missions are also being developed. This paper compares these missions and discusses their expected contribution to our understanding of the frequency of terrestrial-sized planets around other stars.