

The underlying population of hot Jupiters from WASP

Simon Walker, Peter J. Wheatley

Department of Physics, University of Warwick, Gibbet Hill Road, Coventry CV4 7AL, UK
(Simon.Walker@warwick.ac.uk; P.J.Wheatley@warwick.ac.uk)

Abstract

We have inverted the observed sample of WASP planets to the underlying population of hot Jupiters through a quantitative study of the selection biases in the WASP project. This has been achieved by injecting hundreds of thousands of simulated transit signals into WASP light curves and searching for these transits using the standard WASP tools. We find a clear pile up in the underlying population of hot Jupiters with orbital periods between 3 and 5 days, which cannot be explained by selection effects and yet is not apparent in the Kepler data. Our results are consistent with the Kepler sample, but the pile up is not apparent in Kepler due to the relatively low number of hot Jupiters detected.

The WASP project is ideally suited to determine the underlying population of hot Jupiters, having made a detailed study of 326,000 bright FGK stars. Our observed period pile up is a crucial constraint on models of hot Jupiter formation and migration, and casts light on how the dynamical evolution of giant planets is likely to drive the evolution of most planetary systems.

