4-23-2021

Ultra Short Period Planets in K2 III

Prasanna Jayanthi
Boise State University

Elisabeth R. Adams

Brian Jackson
Boise State University

Samantha Johnson

David R. Ciardi

See next page for additional authors

Ultra Short Period Planets in K2 III

Abstract

We validated new ultra short period planets from the K2 mission using various python packages.

Authors

Prasanna Jayanthi, Elisabeth R. Adams, Brian Jackson, Samantha Johnson, David R. Ciardi, William D. Cochran, Michael Endl, Mark E. Everett, Elise Furlan, Steve B. Howell, Phillip J. MacQueen, Rachel A. Matson, Ciera Partyka-Worley, Joshua Schlieder, Nicholas J. Scott, Sevio M. Stanton, and Carl Zielger

ULTRA SHORT PERIOD PLANETS IN K2 III

Prasanna Jayanthi, Elisabeth R. Adams, Brian Jackson, Samantha Johnson, David R. Ciardi, William D. Cochran, Michael Endl, Mark E. Everett, Elise Furlan, Steve B. Howell, Phillip J. MacQueen, Rachel A. Matson, Ciera Partyka-Worley, Joshua Schlieder, Nicholas J. Scott, Sevio M. Stanton, Carl Ziegler

BOISE STATE UNIVERSITY

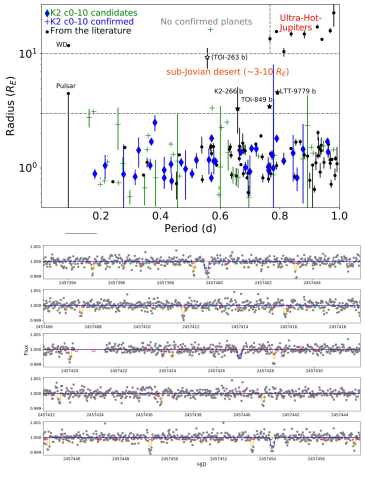
INTRODUCTION

Ultra short period planets are planets with period less than one day. Studying USP systems can give information about planet evolution. Some missions that include observations of USPs are KEPLER, K2 and TESS. We can filter out ultra short period planets from the data using transit light curves. We combined observations from campaigns 0-8 and 10 from the K2 mission with various pipelines to identify 74 UPS candidates.

METHODS

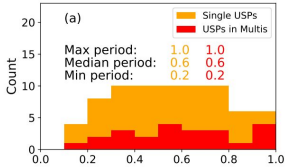
We did the transit search using two pipelines - EVEREST 2.0 and k2sff. We got a precision of 10-20% using EVEREST 2.0 compared to EVEREST 1.0 which was 25% better than k2sff. We searched for periods between 3 hrs to 24 hrs. Then we fit transit light curves using the python packages Batman and PyLightCurve. The EVEREST pipeline detected 24 candidates and the k2sff pipeline detected few candidates.

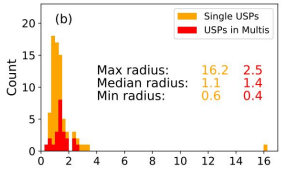
Further, we searched for possible candidates in multi-planet systems for transiting companions by removing transit signals of known planets from the overlapping transits to find new signals. To get better understanding about these candidates we used ground-based observations to determine the stellar parameters.

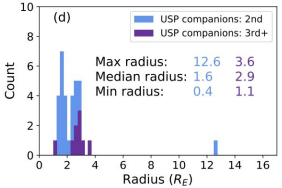


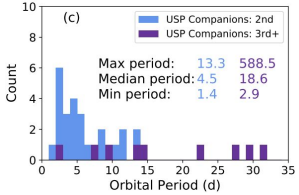
RESULTS

We have validated 21 candidates out of 74 candidates and we can say that a significant amount of ultra short period planets can be found in multi planet systems.









FUTURE WORK

We are currently working on improving our fits for the validated candidates to get better parameters. We are planning to do follow-up ground based observations by checking the gravitational pull by the planet on the host star.

REFERENCES

1. Adams, E. R., Jackson B. (2020), Sevio M. Stanton, Ciera Partyka-Worley. Ultra Short Period Planets In K2 III: Neighbors are common with 13 new multi-planet systems and 10 newly validated planets in campaigns 0-8, 10

Dept. of Physics, Boise State University

prasannajayanthi@u.boisestate.edu