
Ground-Based Observations on TESS Exoplanet 5691.01 Summer 2023

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Summary

Our study aimed to study and characterize data on Object of Interest 5691.01, an exoplanet detected by the Transiting Exoplanet Survey Satellite (TESS). We remotely obtained pre-reduced ground-based data of TOI 5691.01 from the George Mason University Observatory in Fairfax, Virginia. Using AstrolmageJ software and Python collaboratories, we compiled a group of photos of our target exoplanet and detected its light pattern by creating charts that detail the exoplanet's journey through its orbit. There is a certain period when the exoplanet passes in front of its star, allowing George Mason's Observatory Telescope to intake light rays from the star that reflected off the exoplanet. The colors of these rays are altered by the biological makeup of the exoplanet and thus give us researchers an insight into the materials and makeover of the exoplanet. This is what we attempted to discover through our research.

Introduction

As society continues to advance, humanity's pursuit of knowledge of the universe continues to make progress. The ongoing search for similar solar systems and extraterrestrial life has impacted new research on exoplanets in solar systems beyond our own. Exoplanet research allows scientists to explore a wide variety of planetary systems with different sizes, compositions, and orbits. This diversity helps us better understand the range of possibilities in the universe, leading to insights about the formation and evolution of planets. Research like this can give us more insight into our planet and its creation. New technology in observatory telescope utilization has provided groundbreaking discoveries in different exoplanets in our galaxy.

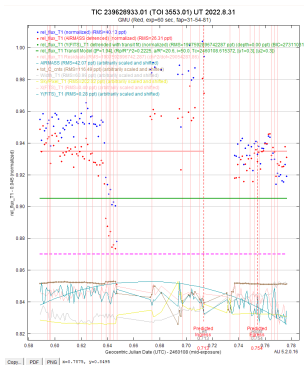
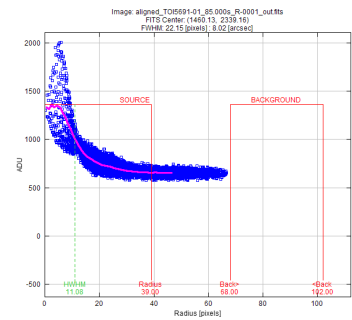
There is a variety of exploration to be made in looking at exoplanets. In particular, an aspect of exoplanet research that is commonly investigated is planetary transits over the sun. Planetary transits occur over a period where the exoplanet crosses in front of its star and blocks out light

that a telescope receives from said star. Typically, this period can last for hours and gives researchers a lot of data to work with.

TESS candidate exoplanets contain Earth-like characteristics and orbit M dwarf stars. TESS is focused on these planets because there is an increased likelihood that they are situated within the habitable zone surrounding their host star. This investigation aimed to assess previously obtained ground-based follow-up data of TOI 5691.01 with the intention of providing additional confirmation, detailed characterization, and classification of the planet. Additionally, we will examine the optimal spectroscopic observation conditions for selected TESS candidate targets.

RESULTS

Through our analysis, we got a couple of charts that depict the exoplanet and its planetary transit in front of its star. However, our research is incomplete, and we were unable to conclude the results from the data.



Conclusions

Our research on TOI 5691.01 remains incomplete, as we ran into errors creating important charts. These incomplete charts limited our ability to understand the data we received, so therefore our results are inconclusive. In the future, we could troubleshoot with the software and work alongside other groups to compare and contrast our data and uncover the missing pieces of the puzzle. Collaborative efforts with other research teams specializing in similar areas can provide valuable insights and solutions to

overcome the issues we encountered during our chart creation process. By combining our expertise and resources, we aim to gain a more comprehensive understanding of TOI 5691.01 and its unique characteristics, ultimately contributing to a more robust and conclusive research outcome.

References

Tang, Sarah "Ground-based Follow-up Observations of TESS Exoplanet Candidates" University of Colorado, Boulder, Colorado

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