PS23-A012 Presenter: **Quanquan Hu**(huquanquan22@mails.ucas.ac.cn)

# GTLS: A GPU Algorithm for Speeding up Exoplanet Transit Detection

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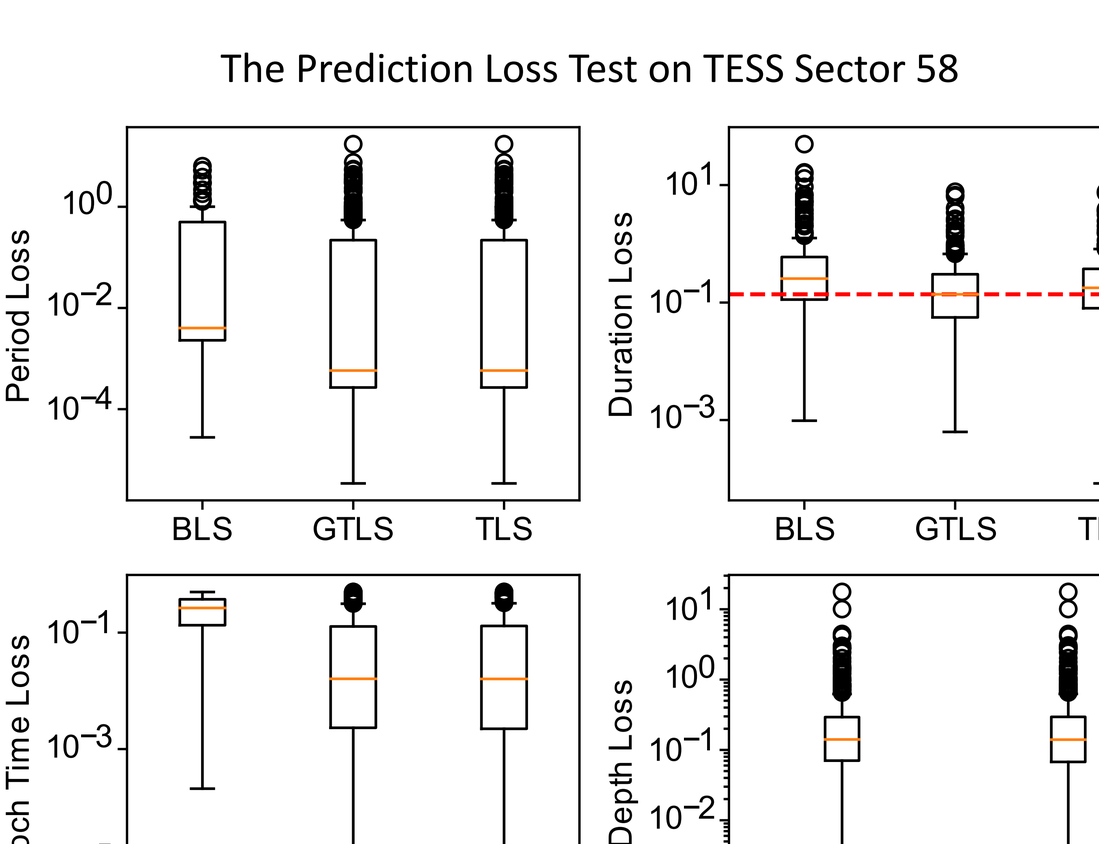
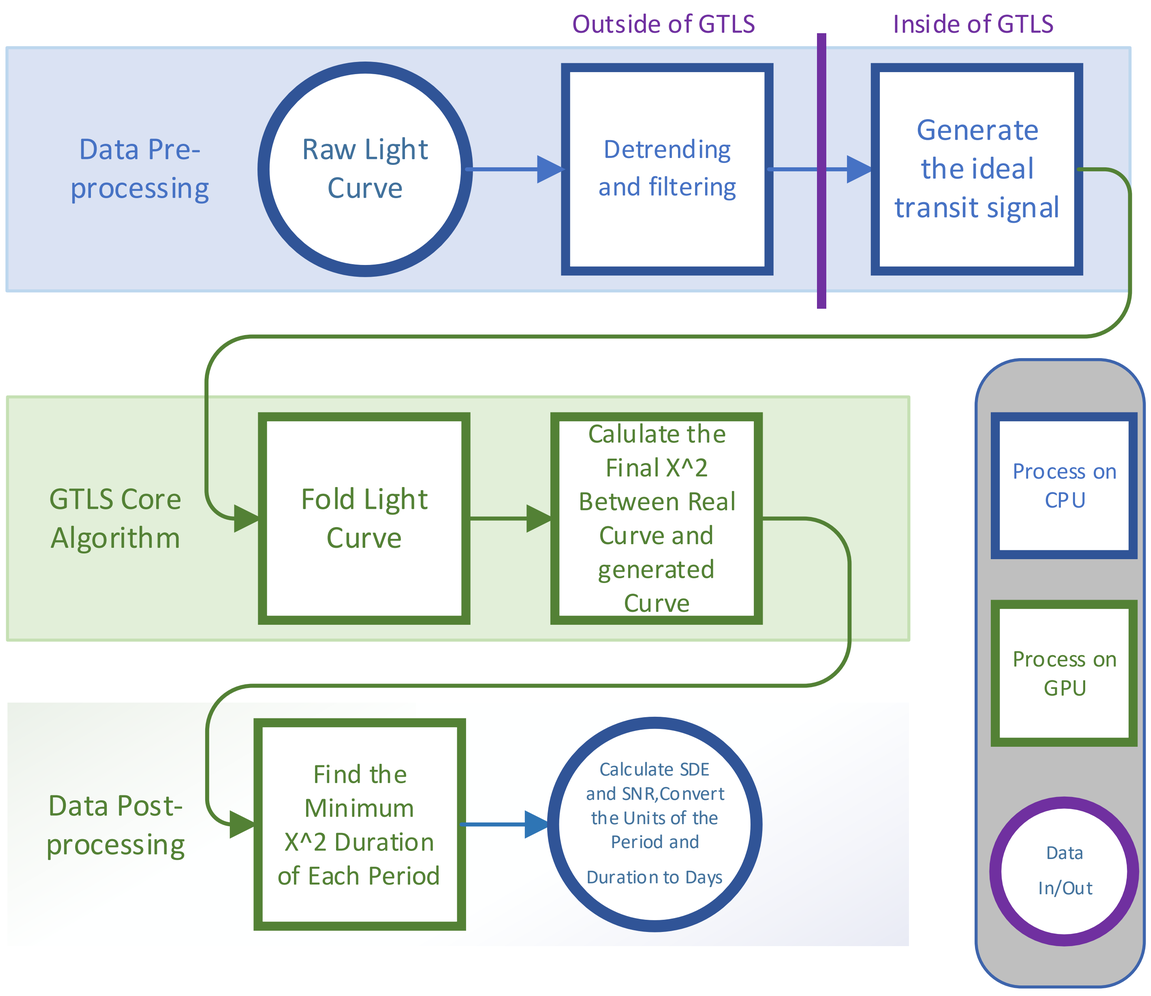
## Abstract

Analyzing transit is a common method to search for exoplanet. Specialized satellites such as Kepler, TESS, etc. generate large amounts of light-change curve data, and higher speed analysis methods are important.

BLS (Box least squares)[1] and TLS (Transit Least squares)[2] are the most common algorithms to find transit signals on light curves.
TLS is proved to be a more accuracy way than BLS.[3]
But TLS is much slower than BLS on the GPU provided by cuvarbase.[4]

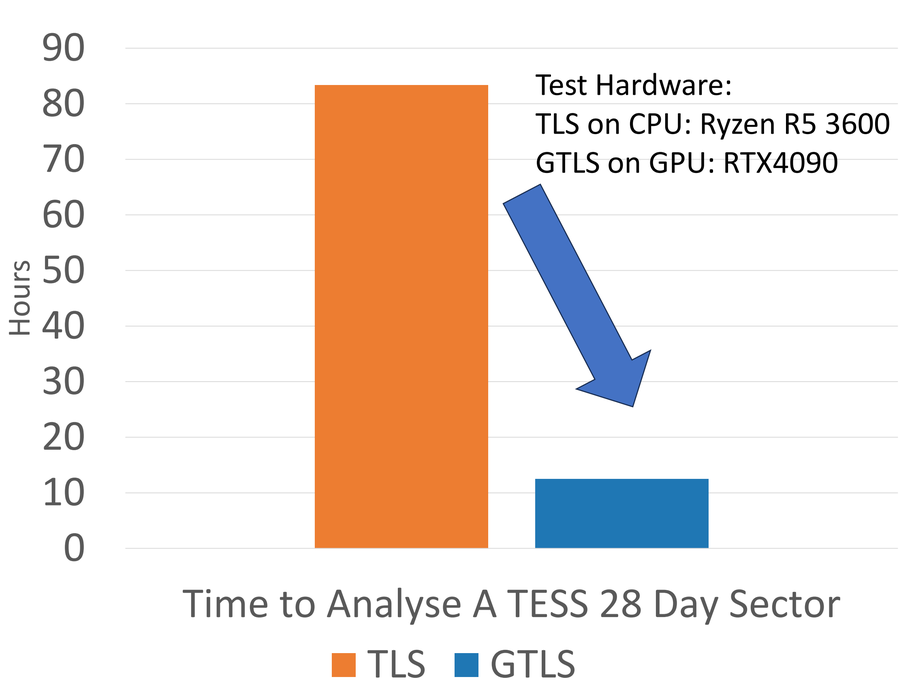
This work provides a way to accelerate TLS using GPU.
It is possible to accelerate TLS by up to 10-20 times.
GTLS also has a slightly advantage on the prediction of the transit duration.










## Reference

[1]Kovács, G. / Zucker, S. / Mazeh, T. A&A A box-fitting algorithm in the search for periodic transits 2002-07
[2]Hippke, Michael / Heller, René A&A Optimized transit detection algorithm to search for periodic transits of small planets 2019-02
[3]Canocchi, G. / Malavolta, L. / Pagano, I. / Barragán, O. / Piotto, G. / Aigrain, S. / Desidera, S. / Grziwa, S. / Cabrera, J. / Rauer, H. Discovering planets with PLATO: Comparison of algorithms for stellar activity filtering 2023-04
[4]Hoffman J., 2017, cuvarbase, https://johnh2o2.github.io/cuvarbase/

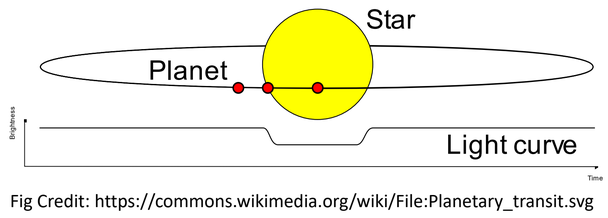



Fig Credit: https://commons.wikimedia.org/wiki/File:Planetary_transit.svg

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