

# Investigating the exoplanet HD88986 b by using TESS & CHEOPS space telescope data.

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## Abstract

*The discovery of transiting planets with orbital periods exceeding 40 days has been exceptionally rare among the 5000+ planets identified to date. This dearth of findings poses a significant challenge to studying planetary demographics, formation, and evolution. In this study, we report detecting and characterizing HD88986 b, a potentially transiting sub-Neptune with the longest orbital period of any known transiting small planet. Our analysis drew on a combination of two sectors of TESS data and a 7-day observation from CHEOPS. Additionally, TLS was utilized for the analysis of HD88986 data. Our findings indicate that HD88986 b, exhibiting two likely single transits on sector 21 and sector 48, both consistent with the predicted transit time from the RV model, is a likely transit candidate. The wide orbit of HD88986 b suggests that the planet did not experience significant mass loss due to XUV radiation from its host star, likely retaining its original composition and offering insights into its formation. Furthermore, the cold nature of HD88986 b, owing to its extended orbital period, presents exciting prospects for future studies on the characterization of its cold atmosphere composition.*

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