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Viewing the PLATO Field Through the Lenses of TESS

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PLATO will begin observing stars in the Southern Field (LOPS2) after launch in late 2026. By this time, TESS will have observed the stars in LOPS2 for at least four years. On average each star in the PLATO field has been monitored for 270 days by TESS already. This data gives us insights into the stars that PLATO will observe and we create a catalogue of all the information we can obtain from TESS for the PLATO targets. TESS monitoring of the PLATO targets allows us to differentiate between quiet and active stars and hence find the most promising stars to detect Earth-like planets. We find these quiet stars by calculating the TESS photometric precision for each Target PLATO Input Catalogue (tPIC) star in LOPS2. We also identify known systems in the LOPS2 field, including 55 confirmed transiting planets, ~300 TESS planet candidate systems and ~2000 eclipsing binaries. To highlight the discovery space where PLATO will have the greatest potential for new detections, we compute respective sensitivity maps for TESS and PLATO of the tPIC stars in the field. We summarise all information we can gather from available TESS data for the PLATO targets into a catalogue summarising the photometric noise of the star, known and candidate planetary systems, eclipsing binaries and detection sensitivites. Pre-launch of PLATO, this TESS-based catalogue will already provide insights of the PLATO target stars and aid to select and focus on the most promising targets.

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