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Validation of Stellar Radii for M-dwarf Targets in the PLATO Input Catalogue

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The ESA M-class PLANetary Transits and Oscillation of Stars (PLATO) mission will acquire light curves of pre-selected targets included in the PLATO Input Catalogue (PIC). PLATO primarily targets solar-type stars, but low mass stars will also be observed being of great interest within the exoplanet field. One of the target samples outlined in the Science Requirement Document is the P4 sample, consisting of a minimum of 5000 cool late-type M-dwarfs with magnitudes brighter than $V=16$. The current release of the PIC (version 2.0.0, June 2023) provides also estimates of fundamental stellar parameters, such as effective temperatures, radii, and masses, for M-type stars. Accurate determination of these parameters is crucial for characterizing host stars and subsequently deriving precise masses and radii of orbiting exoplanets. In particular, deriving accurate radii for the M-type stars represents a significant challenge. Direct measurements are feasible only through interferometry, while various methods involving theoretical assumptions often yield radius estimates inconsistent with empirical observations. In this presentation, we will introduce the scientific requirements outlined by the PLATO consortium Working Group 130 for the selection of the P4 sample, as carried out by Working Group 340. In addition we will detail the methodologies employed for the parameter derivation and explore the possible effects of metallicities on the adopted empirical relations. Validation of the adopted stellar parameters is performed through comparison with independent methods from the literature used to determine stellar radii.

Presenter: PRISINZANO, Loredana (INAF-Osservatorio Astronomico di Palermo)

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