The CoRoT transit candidate catalog

S. Aigrain (1), M. Deleuil (2) and the CoRoT Exoplanet Science Team
(1) Department of Physics, University of Oxford, United Kingdom
(2) Laboratoire d'Astrophysique de Marseille, France

Abstract

We present a full catalog of all the candidate transiting planets identified by the CoRoT space mission during its first 5 years of operations, including homogeneously derived transit parameters, validation diagnostics and a summary of the outcome of follow-up observations, where available.The catalog includes confirmed planets, clear false alarms (mainly blended or grazing eclipsing binaries), but also dozens of unconfirmed cases, where the follow-up was either inconclusive (hot stars, fast rotators) or incomplete (owing to limited telescope time and the relatively faint nature of the CoRoT targets). The catalog is intended primarily as a resource for the community, for example as a starting point for completeness and population studies.

The candidate detection and selection processes have evolved significantly over the course of the mission. Several teams independently analyse the light curves from each observing run, searching for transits and providing ranked candidate lists, which are subsequently merged and ranked manually. This enables the use of some specialist methods, which are better suited to the detection of only certain types of transits, but makes it difficult to provide an overall assessment of the sensitivity of the mission to transits of different depths and periods. However, we note the transit search methods used by the different teams have gradually converged since launch, and there are now fewer teams actively involved in the transit search, with more overlap between the resulting candidate lists.

For each CoRoT observing run, one team member coordinates the selection of candidates for follow-up, with input from the other team members. The set of criteria used to perform this selection have also evolved over the years, becoming more homogeneous. In particular, the light curve fitting tools used to produce the transit parameters and other diagnostics, which are included in the present catalog, are now routinely used to validate candidates and rank them prior to follow-up. We describe a relatively simple binary flag system, based on the aforementioned diagnostics, which we test on the candidates for which the follow-up is complete, showing that it enables more than half of the candidates to be weeded out without rejecting any confirmed planets. The catalog includes some candidates, which perform well under this flags system, and would benefit from follow-up observations by the wider community.