Last news from the CoRoT satellite

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The last results from the french satellite CoRoT, in orbit for more than 550 days, have been presented at various scientific conferences held recently. On his two principal missions, search for extrasolar planets and the physics of stars (study of the internal structure of stars by seismology), the satellite has obtained data with exquisite accuracy, first discoveries for most of them, of which some examples are presented here. The researchers from Laboratoire d'Etudes Spatiales et d'Instrumentation en Astrophysique (LESIA) of Paris Observatory have instigated this space mission, financed essentially by France, with the collaboration of Austria, Germany, Belgium, Brazil, Spain, the European Space Agency (ESA), and realized by the CNES (Centre National d'Etudes Spatiales).

CoRoT discovers a new planetary system

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CoRoT discovered very recently CoRoT-Exo-4b. It is a gaseous giant planet similar to Jupiter: 0.72 times less massive and 1.17 times larger in diameter. Its period of rotation around its star is 9.2 days, which is the second longer period known to date for an exoplanet discovered by transit.

Figure 2: Light curve of CoRoT-Exo4 now folded and rebinned, according to the best transit model (Aigrain et al. 2008). Click on the image to enlarge it.


**Stellar seismology**

Here are some examples of results raising new interrogations:

CoRoT discovered oscillations similar to those already observed in the Sun, in all stars similar to the Sun; which shows the relationship between the Sun and these stars. The levels of the amplitude of these oscillations challenge the community on the current theory of energy transport.

CoRoT measured the oscillations of tens of giant stars; it thus brings a bright confirmation to first results obtained by ground-based observations and opens a new field of investigation. For the brightest stars, CoRoT was able to detect very low frequencies which will make it possible to test the structure of their internal layers.

In many stars, as in the star host of CoRoT-exo-4b, CoRoT is able to measure the period of rotation, thus helping to reach a new stage of knowledge on their evolution.
To date, CoRoT observed more than 50,000 stars. Automatic tools are under development to be able to analyze such a large number of light curves.

At least 50% of these stars have temporal variations, a characteristic that CoRoT was able to distinguish, whereas until now only 10% of stars were detected to be variables. These variations are being classified using a data-processing expert system.

Figure 3: Mass-Period diagram of the 35 exoplanets known by transit, showing the special position of CoRoT-Exo4b (diamond), from Moutou et al (2008). Click on the image to enlarge it.

References


Transiting exoplanets from the CoRoT space mission V. CoRoT-Exo-4b : Stellar and planetary parameters  C. Moutou et al.  Astronomy & Astrophysics, in press

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