



SEMINAIRE régulier du Service d'Astrophysique

ENSEMBLE ASTEROSEISMOLOGY: A NEW VISION INSIDE STARS AND THEIR ENVIRONMENT

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ATTENTION HORAIRE INHABITUEL

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14h00

Helioseismology has proven its ability to determine the structure, dynamics and magnetic activity cycle of the Sun. However, there are still many unknowns and questions to answer. For instance, our lack of knowledge on the detailed mechanisms governing the magnetic cycle has been outlined by the unexpectedly long last solar minimum (from 2006 to 2009).

To better understand the Sun, one way is to study many stars across the HR diagram to help us having a broader and global vision on the stellar evolution. Asteroseismology is a unique and powerful tool that allows us to directly probe stellar interiors.

The two space missions, CoRoT and Kepler, are actually good examples showing that exoplanet search and asteroseismology are unavoidably entangled.

A first step was made with the CoRoT satellite that observed a few tens of solar-like stars and few hundreds of red giants during ~150 days. In many of these stars, acoustic modes could be detected and studied leading to estimation of mass, radius, age, and magnetic activity for some of these stars. The NASA Kepler Mission went even further and led to a drastic change in term of quality and quantity of data by observing thousands of stars for at least 3.5 years. Primarily intended to search for transiting exoplanets, more specifically Earth-like planets around Solar-like stars, Kepler data are also perfect for asteroseismic analyses. Indeed, the exquisite data provided by Kepler are now allowing us to perform analyses as an "ensemble asteroseismology", to investigate scaling laws, stellar activity, and to test stellar evolution theory even inside clusters. On the other hand, detailed studies of host stars provide very valuable information to the exoplanet search. We can determine very accurately the size of the star, therefore of the planet, fix the habitable zone around a star, and estimate the age of the planetary system...

In this talk, we will show and discuss the most interesting and exciting results obtained in asteroseismology with CoRoT and Kepler as well as their impact on their environment and the exoplanet search.



Un café sera servi 15 minutes avant le séminaire

Ce séminaire aura lieu au CEA Saclay – Orme des Merisiers –bâtiment 709, Salle 003.