



## **SEMINAIRE du Service d'Astrophysique**

### **THE XO CONSTELLATION: TRANSITING EXTRASOLAR PLANETS - THEIR DISCOVERY AND CHARACTERIZATION**

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**ATTENTION JOUR INHABITUEL**

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**11h00**

In the past decade, one of the fastest growing fields of astronomy has been the discovery and characterization of planets that pass in front of (or "transit") their host stars. From telescopes in backyards to ones in space, observations of our "XO Project" and many others around the globe are contributing to this burgeoning field of inquiry (e.g. Garcia-Melendo & McCullough (2009) and others' discovery of the transit of the 111-day-period HD 80606b). I will review highlights from some recent programs in which I have participated. In particular, time series photometry of high precision with the Spitzer IRAC instrument have challenged the prevailing hypothesis for the formation of hot stratospheres of such planets (XO-1b, XO-2b, and XO3-b; Machalek et al. 2008, 2009, 2010). Ground-based time-series photometry with a precision of 200 ppm per minute, as demonstrated on XO-2 by Burke et al. with the WIYN 3.5-m, show promise for discovering transits of super-Earths discovered by radial velocities. Prior to the May 2009 servicing mission of HST, we used one of HST's fine guidance sensors, FGS-2r, as a photometer to observe the transiting planet host star HD 17156 for ten straight days with a precision of 120 ppm per minute. We derived the mean density of the star by two independent methods, the transit technique (Nutzman et al 2010) and asteroseismology (Gilliland et al. 2010), and find they agree, thereby validating the two methods. I will also discuss a third-generation system of ground-based survey telescopes, called the XO Constellation, to enable the discovery of more transiting extrasolar planets, especially those with longer periods than the typical 3 days.

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