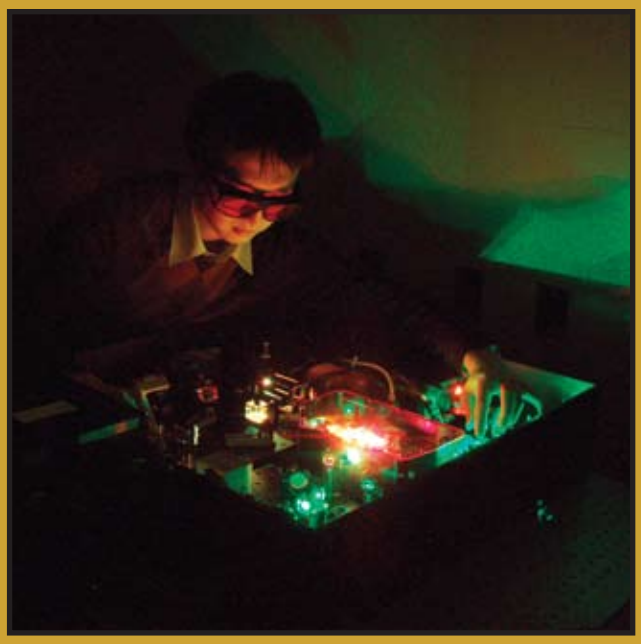
Advanced Instrumentation Seminars

May 12, 2010
1:30 pm, 1st Floor
Kavli Auditorium

Astro-comb

A New Tool to Find Other Earths

Guest Speaker –
Chih-Hao Li
Harvard University



The goal of my research is to look for habitable extra-solar planets (exoplanets). A habitable exoplanet needs to be terrestrial (mass <10 Earth mass) and to be in an orbit inside the habitable zone, where water can exist in its liquid form. The smallest exoplanet found to date have been discovered using the precision radial velocity (PRV) technique. The PRV technique observes the periodic Doppler-shifts of the stellar spectrum as the star orbits the planet-star center-of-mass. Planets with only a few Earth mass have been discovered but they are in extremely close-in orbits with periods of days. To find a truly Earth-like planet, the stellar spectrum will need to be referenced to a light source much more stable and accurate than the thorium-argon lamp or an iodine absorption cell now commonly in use. The novel device I have developed in the last 2 year, coined "astro-comb", has been demonstrated its superior stability and accuracy in the laboratory and in the Whipple Observatory. It is also the first and only reliable calibration source for astro-physical spectrographs in the near infrared bands, which are useful for the exoplanet searches around M dwarfs.

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