



Spectroscopy Society of Pittsburgh October Meeting

Duquesne University – Bayer Learning Center (Pappert Hall)

Wednesday – October 19, 2011

Technology Forum Speaker's Presentation **5:30PM**

Social Hour **6:00PM**

Dinner in the City View Café (6th Floor) **6:30PM**

Business Meeting **8:00PM**

Technical Program Speaker's Presentation **8:15PM**

Deadline for Dinner Reservations **10/14/11**

[On-line Reservations](#)

TECHNOLOGY FORUM - 5:30 PM

Dr. Thomas Ferguson, Professor of Physics, Carnegie Mellon University

"The Large Hadron Collider (LHC) - Exploring a New Energy Frontier."

The Large Hadron Collider (LHC) is a 7 TeV x 7 TeV proton-proton colliding-beam accelerator, situated at the European accelerator center, CERN, outside Geneva, Switzerland. The 14 TeV center-of-mass energy of the LHC is a factor of 7 higher than the previous highest-energy accelerator, the Tevatron at Fermilab, thus opening up a entirely new energy regime for study. The LHC began taking data in September 2009 at a center-of-mass energy of 7 TeV, and has already become the highest-intensity colliding-beam accelerator in history.

I will give a short introduction on the history of colliding-beam accelerators and the Standard Model of particle physics. I will then discuss the LHC itself, the Compact Muon Solenoid (CMS) experiment, of which I am a part, and the present results and possible future discoveries that could come from the LHC.

Bio

Thomas Ferguson is a professor of physics at Carnegie Mellon University. He received his Ph.D. from UCLA in 1978, and was then a research scientist at Cornell University for 7 years, before joining the CMU physics faculty in 1985. He has worked on the electron-positron colliding-beam accelerators SPEAR at the Stanford Linear Accelerator Center, CESR at Cornell University, and LEP at the European accelerator center CERN. Since 1994, he has been a member of the Compact Muon Solenoid (CMS) collaboration, helping to build the CMS detector, which is now taking data at the CERN Large Hadron Collider (LHC).



TECHNICAL PROGRAM - 8:15PM

Dr. David Latham, Harvard-Smithsonian Center for Astrophysics, Cambridge, "'Super Earths and Life"

"Super Earths and Life"

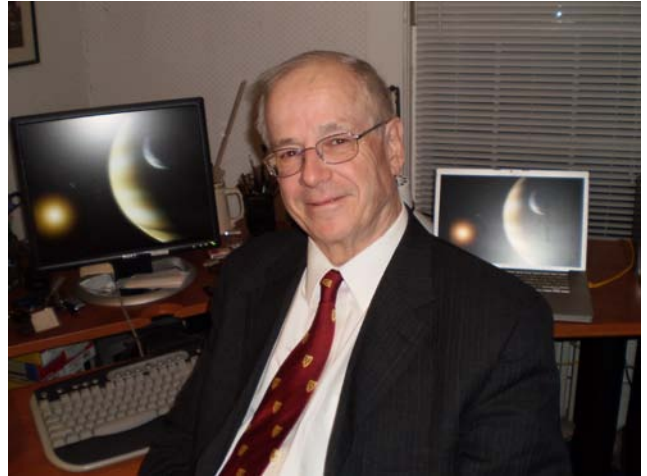
Transiting planets are special. The amount of light blocked by the planet as it passes in front of its host star sets the size of the planet (relative to the star). If an orbit can be derived from Doppler spectroscopy of the host star, the light curve also provides the orientation of the orbit, leading to the mass of the planet (again relative to the star). The resulting density for the planet can be used to constrain models for its structure and bulk properties. We are on the verge of using these techniques to characterize a population of Super Earths, planets in the range 1 to 10 Earth masses that may prove to be rocky or water worlds. Space missions such as Kepler, Plato, and TESS promise to play key roles in the discovery and characterization of Super Earths.

Transiting planets also provide remarkable opportunities for spectroscopy of planetary atmospheres: transmission spectra during transit events and thermal emission throughout the orbit, calibrated during secondary eclipse. Spectroscopy of Super Earths will not be easy, but is not out of the question for the James Webb Space Telescope.

Our long-range vision is to attack big questions, such as "Does the diversity of planetary environments map onto a diversity of biochemistries, or is there only one chemistry for life?" A giant first step would be to study the diversity of global geochemistries on super-Earths and Earth analogs.

Bio

Dave Latham is an astronomer at the Harvard-Smithsonian Center for Astrophysics in Cambridge. He works on the discovery and characterization of planets around other stars, with the goal of identifying planets enough like the Earth so that water could be liquid on the surface and life as we know it might be comfortable. NASA's Kepler mission is enabling important progress towards this goal.



Dinner Reservations:

Please register on-line at <http://www.pittcon.org/misc/societies/ssprsvp.php> to make dinner reservations NO LATER THAN FRIDAY, October 14, 2011. This month's entrée is stuffed pork chop with apple and cranberry stuffing. Dinner will cost \$8 and checks can be made out to the SSP. If you have dietary restrictions, please indicate them when you RSVP.

Parking Instructions:

The Duquesne University Parking Garage is located on Forbes Avenue. Upon entering the garage, receive parking ticket and drive to upper floors. Pick up a parking chit at the dinner or meeting.