

# AMERICAN ASSOCIATION OF PHYSICS TEACHERS

Spring 2001 meeting of the Southern California Section

Saturday, April 21, 8:15 AM–4:00 PM

Harvey Mudd College, Galileo Hall—301 E. 12<sup>th</sup> Street, Claremont, Claremont  
Local Contact: Peter Saeta, <saeta@hmc.edu>, 909-607-3939



## 8:15 AM **Registration, Refreshments, Exhibits**

### 8:30 AM **Workshops** (\$5 registration fee)

“Vernier Lab Pro Computer/Calculator Interface”

Leader: Clarence Bakken, Gunn High School  
Sponsored by Vernier Software

“Low Tech Measurements of Amusement Park Rides”

Leaders: John McGehee, Peninsula High School

### 10:00 AM **Welcome and Introductions**

### 10:15 AM **“Chaos in Frog Heart Attacks”**

Scott Searway and Paul Stanley  
California Lutheran University

We have investigated the behavior of frog heart muscles which are externally stimulated at rates above the resting level. There is clear evidence for period doubling bifurcations which provides evidence that fibrillation is a form of chaos. Our next efforts will be to develop a detuning mechanism to defibrillate the frog, thus saving another frog heart attack victim from an untimely death. And yes, this is real.

### 10:30 AM **“The New Barometer Story”**

Clarence Bakken, Gunn High School

With the development of new interfaces, they are finding their way into new and unusual places. See some ways in which barometers are being used and how the original question in “The Barometer Story” can now be addressed with new technology.

### 10:45 AM **“Photographing the Aurora Borealis”**

Harry Manos, Eden-Gardens

The purpose of this paper is to provide information for either the beginning or amateur photographer that has never photographed an aurora and would like to get good pictures the first time out, and to provide physics teaching ideas for studying auroras.

### 11:00 AM **Invited Talk**

**“The Longitude Problem”**

Peter Saeta, Harvey Mudd College

While returning from operations in Gibraltar in 1707, British Admiral Sir Cloudisley Shovell became mired in fog for 12 days. When the Admiral and a sailor computed differing positions of the fleet by “dead” reckoning, the sailor was promptly hanged. Soon thereafter 4 of the 5 ships ran aground, killing 1647 souls.

The problem of determining longitude at sea bedeviled the military and merchant marine alike and became the greatest

scientific problem of the era. With the Longitude Act of 1714 Parliament promised a king’s ransom for the solution to the problem. Master of the Mint, Sir Isaac Newton observed: “One [method] is by a Watch to keep time exactly. But, by reason of the motion of the Ship, the Variation of Heat and Cold, Wet and Dry, and the Difference of Gravity in different Latitudes, such a watch hath not yet been made.”

Newton and others bet on an astronomical solution; John Harrison, a rural clockmaker who had built his first wooden clock the year before, aimed to prove Newton wrong. In 1761-2 a Harrison clock aboard a vessel sailing from London to Jamaica lost only 5.1 seconds during the 81-day trip. Despite maneuvering by the astronomers attempting to prevent Harrison from claiming the prize, he was finally awarded the Longitude Prize in 1764.

### 11:50 AM **Announcements**

### 12:00 **Lunch (and “networking”)**

### 1:30 PM **Invited Talk**

“A Tribute to Bob Wild”

John Nickel, UC Riverside  
Walt Ogier, Pomona College Emeritus  
Bill Layton, UC Los Angeles  
+ “Wild” Demos by Ron Ebert, UC Riverside

### 2:45 PM **“The Tale of the Tuning Fork”**

Fred Carrington, Grant High School  
Bill Layton, UCLA  
Glenn Malin, University High School

### 3:00 PM **“Ideal Gas vs. Photon Gas”**

Harvey Leff, Cal Poly Pomona

The ideal gas commonly plays a key role in the study of thermodynamics, and students can get the incorrect impression that “everything is an ideal gas.” Supplementation with the photon gas can help prevent such misunderstanding. The photon gas is a quantum mechanical, relativistic system with a variable number of particles. Unlike the ideal gas, the photon gas has a volume-dependent internal energy, yet its equations of state yield to easy analysis and interpretation. I will illustrate how comparisons between photon and ideal gases can help clarify thermodynamics and enrich its study.

### 3:15 PM **“Show and Tell”**

Glenn Malin, Paul Stanley, Gary Reynolds

### 3:45 PM **Order of Magnitude Contest & Door Prizes**

### 4:00 PM **Closing Remarks/Meeting Adjourns**

## **What’s the Order of Magnitude Question?**

“What is the ratio of the average density of the Milky Way Galaxy to that of our Solar System?” The winner—i.e., the person with the *median* answer—gets first pick of the door prizes! Must be a member and must be present to win.

## **Lunch anyone? (Please respond by April 18)**

A buffet style lunch will be available on campus for \$7.50. We need an estimate of the number of people so please respond to John Mallinckrodt <ajm@csupomona.edu> by April 18. Thanks.

## **Show’n Tell!**

There’s still time available. Share a favorite demo with your friends.

## **Thank you to our Exhibitors and Supporters!**

Harcourt Publishing  
Vernier Software

## **Future meetings (Mark your calendars)**

AAPT Summer 2001, Rochester, NY, July 21-25, 2001

SCAAPT Fall 2001, (to be announced), ~late October 2001

AAPT Winter 2002, Philadelphia, PA, January 19-23, 2002

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<http://www.callutheran.edu/scaapt>

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**How do I get to the meeting?**

From the 10 (San Bernardino Fwy), exit at Indian Hill Blvd, Claremont. Go north on Indian Hill about 2 miles to Foothill Blvd (Route 66!). Right on Foothill and then several blocks to the next traffic light at Dartmouth. Park on Foothill, Dartmouth, or 12<sup>th</sup> street (parallel to and just south of Foothill.)

The meeting will be in Galileo Hall which is just southeast of the corner of Dartmouth and Foothill (at the western end of the Harvey Mudd College campus). Galileo Hall is entered via the sunken Hixon Court which is just east of the (five story tall, you can't miss it) Sprague Library.

See <http://www.hmc.edu/visitor.html> for maps.

**Where do I pay?**

Section dues are just \$10/year and are our primary source of support; we receive nothing from the national organization. Members get final programs before the meeting and are eligible for great door prizes. See the SCAAPT website for how to sign up by mail or do it at the meeting. We need your support! Bring a new teacher. Heck, bring an old one!

**Subscribe to the SCAAPT email list**

Send a message to  
[listproc@listproc.csupomona.edu](mailto:listproc@listproc.csupomona.edu)  
with the single line:  
subscribe scaapt yourname  
(replacing "yourname" with your name!)

**Visit the SCAAPT website**

For meeting information, a list of section officers and contacts, link to the national AAPT, etc.

<http://www.callutheran.edu/scaapt>

**Submit a change of address online**

You may submit changes of address using the online form available via a link from the section website or directly using

[http://www.csupomona.edu/~ajm/myweb/scaapt/ch\\_add.html](http://www.csupomona.edu/~ajm/myweb/scaapt/ch_add.html)

**Submit a contribution to the next meeting Online**

You may submit contributions using the online form available via a link from the section website or directly using

[http://www.csupomona.edu/~ajm/myweb/scaapt/ab\\_sub.html](http://www.csupomona.edu/~ajm/myweb/scaapt/ab_sub.html)

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