



**American
Association of
Physics
Teachers**

Joint Meeting
Northern California/Nevada &
Southern California Sections

Friday & Saturday, April 8-9, 2005
California State University ~ Fresno

**“The World Year of Physics 2005 -
Einstein in the 21st Century”**

Friday Evening, Downing Planetarium
Saturday, McLane Hall, Fresno State University

Local Host: Ray Hall
email: rhall@csufresno.edu

For maps, driving directions, & hotel information:
<http://physics.csufresno.edu/rhall/outreach/aapt0405.htm>
www.ncnaapt.org

**American Association of
Physics Teachers**
Northern California/Nevada Section
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~ Directions to Fresno State ~

- From Highway 99 North, take the Shaw Ave. (west) exit, go about 5 miles and turn left on Cedar Ave. Fresno State is between Shaw and Barstow Avenues. Turn right onto Barstow. Turn right onto Maple and park. Follow the signs from there.
- From Highway 99 South, take Highway 168 East exit to Shaw Ave (east). Continue on Shaw Ave. and turn right on Cedar Ave. Fresno State is between Shaw and Barstow Avenues. Turn right onto Barstow. Turn right onto Maple and park. Follow the signs from there.

~ Accommodations ~

When you make your reservation, mention you are attending the AAPT meeting at Fresno State for possible discounts. All hotels offer internet access.

University Inn

\$57.99 (1 mile away)
2655 E. Shaw Ave.
Fresno, CA 93710
(559) 294-0224

Ramada Inn

\$70 (2.7 miles)
324 E. Shaw Ave.
Fresno, CA 93710
(559) 224-4040

Picadilly Inn

\$74 (1.2 miles)
4961 N. Cedar Ave.
Fresno, CA 93726
1-(800) HOTEL-US

Red Roof Inn

\$57.99 (4.1 miles)
6730 N. Blackstone Ave.
Fresno, CA 94306
(559) 431-3557

Quality Inn

\$79-99 (2.5 miles)
480 E. Shaw Ave.
Fresno, CA 94306
(559) 229-5811

REGISTRATION FREE*—*What a deal!*

*fee is *waived* for first-time attendees and students! The rest of us pay only \$15. A bargain at twice the price!

~ Upcoming Events ~

- Summer, AAPT National Meeting
August 6-10, 2005 University of Utah
Salt Lake City, UT
- Fall, NCN AAPT Section Meeting
November 4-5, 2005
Chico State, Chico, CA
- Winter, AAPT National Meeting
January 21-25, 2006
Anchorage, Alaska
- Spring, NCN AAPT Section Meeting
April, 2005
Menlo School *or* San Mateo High School





~ Friday Evening Social ~
April 8, 2005 ~ 6:00 – 9 PM

Steven White, director of the new **Downing Planetarium**, will give us a tour of this beautiful new facility. Doors will open at 6 PM. Those who arrive by 7:00 PM will be treated to the show "Ringworld"—a documentary about the planet Saturn. Don't be late! The planetarium is adjacent to the parking lot of Barstow and Maple. Snacks and refreshments will be provided by Pasco Scientific.

Attention New Physics Teachers! PTSOS is coming! PTSOS is an NCN-AAPT-sponsored project funded by a donation from the Karl Brown Foundation, that assists physics teachers in their vulnerable first years of teaching. PTSOS is headed by **Paul Robinson, Dean Baird, Stephanie Finander**. The next round of workshops will begin next fall. New teachers should email Stephanie Finander at sfinander@aol.com for more information on how to get signed up for next year's program now.

PROGRAM

SATURDAY, April 9, 2005

Morning Session, McLane Hall, Room 162

7:45 Registration, Coffee, Donuts, and other culinary delights.

8:45 Welcome and Announcements

9:00 Show & Tell

Share your favorite demonstration or teaching tip. Since new teachers and section members will be at this meeting, you are encouraged to dust off some of your oldies but goodies. If you have handouts, please bring 75 copies. *Time limit is 5 minutes per person.*

10:00 Invited Speaker: "Einstein's Quantum Theory of Radiation Revisited"

Michael Nauenberg, UC Santa Cruz (emeritus),
michael@mike.ucsc.edu

In 1916 Einstein published a remarkable paper entitled "On the Quantum Theory of Radiation" where he derived Planck's formula for black-body radiation by a new statistical hypothesis for the emission and absorption of electromagnetic radiation based on discrete bundles of energy and momentum which we now call photons. Einstein replaced Maxwell's classical electrodynamics by a stochastic process, but he did not discover the quantum statistics for photons that Bose communicated to him seven years later. In this talk I will also show how Einstein's theory determines these statistics. Like Boltzmann's classical counterpart, Einstein's statistical theory leads to an irreversible approach to thermal equilibrium. However, since this violates time reversal, Einstein's theory cannot be regarded as a fundamental theory of physical processes. Apparently Einstein and his contemporaries were unaware of this problem, and even today this problem is ignored in

contemporary discussions of Einstein's treatment of the black-body spectrum.

11:00 Invited Speaker: “Musings on 1905”

Lewis Epstein, City College of San Francisco (retired),
thinking@prodigy.net, (415) 826-3488

This talk will focus on Einstein's 1905 works, related topics, and questions. For example, what does relativity say about out of body travel and about dematerialization or materialization and about toy trains? How did astrology almost become science? Do molecules really diffuse from high to low concentration? What is “Jewish physics” and where did it come from? A seldom mentioned, but very illustrative anecdote from the end of Einstein's life is one worth passing on to your grade-hungry students. What did Einstein know about the 1887 Michelson experiment? In 1887 what was the anticipated result? Who was Herr Einstein in 1905? Who was Einstein's science star? Did you know Einstein's first job was *not* patent examiner? It was as a high school physics teacher—and his students' misbehavior ended it.

12:00 LUNCH: A delicious and tasty box lunch will be provided for \$10.

1:00 Raffle/Business Meeting: Revising and updating our Constitution, elections, and other agenda items.

1:45 Invited Speaker: “The Dark Century: Matter, Energy, and the Future of the Universe”

Virginia Trimble, UC Irvine, vtrimble@uci.edu

Dark matter is a sort of shorthand for an enormous body of evidence indicating that most of the stuff in the universe neither emits nor absorbs its fair share of light. Some of

the data go back more than 80 years, and there are hints of it even earlier. Dark energy, also called quintessence, the cosmological constant, and even worse things, is both an integration constant in Einstein's equations and a similar shorthand. The database here is not quite so extensive or so deeply grounded in history, but still very persuasive, implying that the universe is as flat as general relativity allows and that its expansion is accelerating. There are droves of candidates for both dark matter particles and dark energy fields, though so far no laboratory detections of any. Something can, however, be said about their properties, which, in turn, determine the long-range future."

~ Break ~

Contributed Papers

3:00 “Teaching Relativity using Spacetime Graphs”

Michael Huster, Simpson University, Redding, CA
mhuster@simpsonuniversity.edu

I teach a general education course about modern science for college students who are math-phobic. I have used spacetime graphs to explain phenomena like the Polevaulter and the Barn paradox and the Twin Paradox. The students plot events and worldlines in different reference frames, compute spacetime intervals, and interpret the results.

3:20 “An Excel Spreadsheet Model of Supernova Light Curves”

Kevin McLin, Sonoma State University,
mclin@universe.sonoma.edu

As part of a NASA funded Education and Public Outreach program for the XMM-Newton mission, I have created an exercise for high school students that allows them to fit a

theoretical light curve to observational supernova light-curve data. The model light curve uses Excel spreadsheet software and is based on the decay of several species of radioactive isotopes that are produced in the stellar explosion. Students adjust the amount of each isotope and the timestep for the calculation to produce a fit to the data.

3:40 “Physics in the Movies”

Dan Burns, Los Gatos High School, dburns@lghs.net

Scenes from popular and classic movies offer an engaging way to illustrate the use of physics principles in "real" life. Physics teachers have been exploiting this by showing selected clips from 2001: A Space Odyssey, The Omen, and many other movies for decades. Methods to facilitate the editing and presentation of movie clips from DVDs will be described. A list of 36 movie clips will be distributed and ideas for classroom use will be discussed. Attendees will leave with resources to allow them to easily use these clips in their classrooms.

4:00 “Help for Physics Teachers”

Andria Erzberger, retired, PTR, andriae@mac.com

Many high school physics and physical science teachers have little physics in their backgrounds. An NSF program gives help to those teachers through local colleges and universities. The first workshop in California will be held in the Central Valley June 27-July 1. This first summer teachers will study motion and forces, use low- and high-tech equipment, practice inquiry, receive housing and a stipend, and may receive graduate physics credit. How do high school teachers get involved? How are colleges selected to host this program?

4:20 “CHICOS”

Sarah Johnson, University of La Verne,
johnsosa@ulv.edu

The CHICOS project, operated by the Kellogg Laboratory at Caltech, represents a unique blending of cutting-edge scientific research and broad-based educational outreach. CHICOS is an active research array for the detection of ultra-high energy cosmic rays. The array as presently deployed has already seen extended air showers, and the soon-to-be-completed CHICOS 90 array will observe with large aperture in the energy range from 10^{18} to 10^{21} eV, with the angular resolution to address questions of clustering in several years of run time. In the CHICOS project, schools across the Los Angeles area provide the "net" of detector sites with ready-made infrastructure and a valuable population of teachers and students who participate in the project.

4:40 “What Can You Do with a Bachelor’s Degree in Physics?”

Joe Tenn, Sonoma State University, joe.tenn@sonoma.edu

As I conduct the annual poll of our graduates I am once again struck by the many ways in which they make use of their physics educations. Besides the obvious--physicists, astronomers, teachers, engineers, and computer programmers—there are CEOs, pilots, physicians, a patent attorney, and an actress on Broadway. I will present some data and quotes from graduates about the utility of a physics degree. You can see what 58% of Sonoma State University's physics graduates are doing at <http://phys-astro.sonoma.edu/>.



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Spring, 2005 Joint Meeting

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Attention: Physics Staff
Address Correction Requested