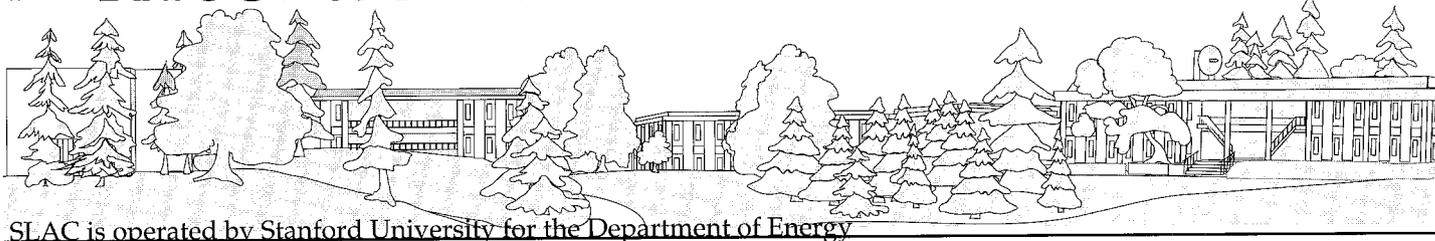


# The Interaction Point

Events and Happenings  
in the SLAC Community  
August 1999, Vol. 10 No. 8



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## Education Program Studies Cosmic Rays

**COSMIC RAYS**

**Cosmic Ray Telescope**

Wherever we are on earth, muons from cosmic rays are passing through us.

Cosmic rays are caused by **protons** from outer space.

When a proton (shown in yellow) hits the air in the earth's upper atmosphere it produces many particles. Most of these decay or are absorbed in the atmosphere.

One type of particle, called **muons** (shown in red), lives long enough that some reach the earth's surface.

The apparatus below counts muons which pass through one of the three pairs of black-wrapped scintillator counters.

Space

Atmosphere

Earth

As you can see, fewer muons are counted from the horizontal directions than from the vertical. In the horizontal direction, the muons must travel further to reach the surface of our planet, so more of them decay.

IF YOU'VE BEEN TO the SLAC Visitor Center, then you've seen the cosmic ray detector, but you may not know exactly why the exhibit is there or what it does.

The idea for the instrument came about from teacher workshops conducted over the past few years by theorist Helen Quinn. During these workshops, Willy Langeveld and Don McShurley, along with Crystal Springs teacher John Venuti, retiree Steve Shapiro, and community college teacher Eric Harpell, developed a compact cosmic ray detector that could be built for minimal cost for use in a classroom. Thanks to their

efforts, a more refined version was put into the Visitor Center in the Panofsky Auditorium for the enjoyment of staff and visitors.

This summer, Quinn, Langeveld and McShurley are working with Joan Fu, from Los Angeles Harbor Community College, to move a step further in the use of the cosmic ray detector via a web camera. They are developing classroom exercises on cosmic rays to be posted on web pages. Programmer Ken Lai is working on the graphical interface for the pages. Once the pages are developed, teachers and students will be able to access the SLAC detector and perform a variety of experiments.

One simple experiment is recognizing that cosmic rays exist and they are only one of the ways that people are exposed to background radiation. Another experiment has to do with how we conduct research. Students will be asked to look at the reliability and accuracy of data, what can be trusted, what equipment effects there might be, or what other factors might be influencing the data. A third exercise makes plausible that relativity theory is needed to explain the results.

*(continued on Page 3, Column 1)*

## Annual Soccer Match Ends in Tie

THE ANNUAL SOCCER MATCH held July 12 between the SLAC Soccer Club (green shirts) and the SLAC Summer Institute (white shirts) might not have been the World Cup, but there was still plenty of drama as the two teams battled to a tie finish. There was a large turn out for both teams — around 24 players per side, which meant lots of substitutions during the game. Fans for both sides were on hand to cheer the teams on in a great soccer match.

(Photo: R. Erbacher)



*Is it soccer...or are these electrons racing towards the target? The outcome was just as blurred as this photo. After a 3 - 1 lead by the SSI at halftime, the teams battled to a 5-5 tie by game's end.*

*The SLAC Team*

(Photo: R. Erbacher)



(Photo: Y. Nir)



*The SSI Team*

## Being Mindful

A FREQUENT STRESS-REDUCING technique taught by health professionals is to be “mindful” of what you are doing at the moment — eating, walking, breathing...in addition to lifting, loading, or climbing. This reminder to slow down and be aware of your actions applies both at home and at work to make you more safe and healthy in your environment.

The next time you begin a different activity than what you have just been doing, stop for 10 seconds (that’s not long) and think to yourself: what am I about to do and what are the possible hazards? If it’s walking to the cafeteria, know where your feet are on the uneven path. If it’s climbing a ladder to do maintenance work, follow the three-point rule (2 hands/1 foot or 2 feet/1 hand on ladder at all times) and keep focused on your goal.

As human databases, we process a huge amount of information each day and can become distracted by our surroundings, to a point where we are endangering ourselves or others with no intention of doing so. Being mindful doesn’t have to mean being “on guard” in a muscle-tensing way, especially if you allow enough time for tasks at home or at work. Think of it as a partnership with your senses!

Suggestions on how to be safer at work can be passed on to your Operating Safety Committee representative or to me directly (ext. 3603 or [dabney@slac.stanford.edu](mailto:dabney@slac.stanford.edu).) The next TIP column will list any safety hints which have been received, and we’ll all be on our way toward better mindfulness!

*—Janice Dabney*

*Chair, Operating Safety Committee*

### Work Safe, Work Smart

There have been no injuries involving days away from work since the last reported claim on 6/7/99 according to Sharon Haynes, Worker's Compensation Coordinator. The number of calendar days between that incident and the date of 7/15/99 is 38 days. SLAC's record number of days between claims remains at 150 days.

## Cosmic Rays

*(Continued)*

Cosmic rays are called cosmic because they come from somewhere out in the cosmos, not our own solar system and probably not even our own galaxy. The "primary" cosmic rays — the ones arriving at the top of the atmosphere from outer space are very high-energy particles, most often protons. They have a range of energies that extends up to many trillion electron volts (TeV).

These particles interact strongly so they scatter off the nuclei of atoms in the upper atmosphere. In these high-energy collisions many secondary particles are produced, including lots of high-energy pions which also interact and make more pions. All the pions eventually decay making the high-energy muons. Only a small fraction of the muons reach the earth's surface, because most decay in flight. At higher altitudes there are more muons, because fewer have decayed as they have had less travel time to the high altitude than to sea level.

High-energy cosmic rays should not be confused with the constant bombardment that the earth's atmosphere receives from low-energy radiation in the form of what is called the solar wind. Solar wind consists of protons and electrons from the sun. It causes such phenomena as the Aurora Borealis and may cause radio interference on earth, and can sometimes damage communications satellites. Solar wind doesn't reach the earth's surface because it is deflected by the earth's magnetic field, and also because its energy is too low to penetrate the atmosphere. Through the mechanism described above, muons produced from high-energy cosmic rays do reach the earth's surface, but fortunately there are not too many of them: about one goes through an area the size of your fingernail each minute.

*—Helen Quinn and Willy Langeveld*

## The Good Samaritan

IT WAS A DARK and stormy night.....no, wait—that's another story. But, it was dark when EFD's Wanda Elliott found herself stranded on the side of Hwy 101 at 4:45 AM in that cold, lonely stretch between Salinas and Gilroy (near the Red Barn between Prunedale and Aromas, but not near a phone). Thank goodness BSD's Joan Hennes, who also lives in the hinterlands of Salinas, glanced at the stranded motorist on her way to the train station at around 6:30AM. After convincing herself it really was Wanda, she went back to give assistance, which meant driving to a phone and waiting until the tow truck showed up. Just a flat tire, but if not for Joan's act of kindness, it could easily have been a much bigger problem for Wanda. It's nice to know that SLACers look out for each other, even when not at work! And, yes, Wanda now has a cell phone.

*—Perry Anthony*

## New Tech Pubs Head



LATE IN JUNE, PATTIE Myers joined the Research Division's Technical Information Services as the new head of Technical Publications. Myers brings to SLAC a strong publishing and managerial background encompassing over 20 years with notable textbook and trade houses, including Harcourt, Brace Jovanovich, Random House, McGraw-Hill, Addison-Wesley Longman and Sierra Magazine. At these publishing houses, Myers managed the technical publications process aimed at the advanced researcher, including books in the fields of biology, engineering and foreign languages. Myers has also been active in the professional organizations of Bookbuilders West and the California Academy of Sciences.

Myers spent her first few weeks at SLAC becoming familiar with the strengths and skills of the Technical Publications staff and the needs of SLAC authors. Myers is delighted with the high standards of the team. She knows that an important task is to effectively position the group to continue meeting the needs of the SLAC authoring community, in the face of the rapidly changing publishing environment. That means keeping pace with advances in software, authoring needs, and appropriate delivery systems. "Tech Pubs must remain a resource and information conduit supporting flexible, new approaches to disseminating information to the intended audiences," says Myers. One of her initial priorities here at SLAC will be researching the delivery of pristine math to the Web. "The technology is here and is successfully being implemented." Drop by her office (Room G200, second floor, Central Lab building) to introduce yourself.

*—Ann Redfield*



News from the  
Web Information Manager  
Ruth McDunn, mcdunn@slac

## SLAC Welcome Page and Netscape

As they say, "It's a feature, not a bug," but if you are using Netscape and you resize the welcome page ([www.slac.stanford.edu](http://www.slac.stanford.edu)), you may end up with a blank page. The cause of this "feature" is the fixed width table structure used to format the page. If you experience this problem, just select "reload" on your browser and the page will reappear. The design of the top level SLAC pages will soon be changing, and I promise this problem will be fixed.

## InterLab 99 Conference at SLAC

Mark your calendars! The InterLab '99 Workshop will be held on November 3-5 at SLAC. The workshop focuses on technical and management issues relating to developing and applying Internet resources in the Department of Energy National Laboratories and related facilities, as well as on the cooperative development and sharing of these resources. This year a special XML tutorial will be offered on the afternoon of November 2. The themes this year will be "Searching and Knowledge Management" and "Tools for Site Management, Authoring, and Collaboration." Keep an eye on the website for more information ([www-project.slac.stanford.edu/interlab99/](http://www-project.slac.stanford.edu/interlab99/)).

## Arsella Raman Retires



SERIALS LIBRARIAN, ARSELLA RAMAN, a 28-year veteran of SLAC, retired at the end of July. We will all miss her serene, competent and unique presence. There is a bittersweet feeling of sadness for us (but happiness for her) as Arsell will now have

the leisure to spend more time with her family and concentrate on all of her many outside interests.

Arsella is a native of Norway, where she got her degree at the National Library School of Norway. She's been at the Library since 1970 and has been Serials Librarian since 1975. Arsell was responsible for the acquisition and monitoring of over 600 journal titles. During her tenure at SLAC, Arsell designed the Serials online database, was an expert in SPIRES, wrote articles for the SLAC *Beamline*, and quietly became an indispensable member of the library staff, all while working part-time. Arsell was also backup Reference Librarian and helped many patrons find

their way to HEP preprints, decipher obscure journal citations, locate just the right IEEE Standard and navigate Stanford University's online databases. Her fluency in Norwegian, Danish, Swedish, German and French was invaluable in processing international materials.

Arsella is also widely known for her devotion to the local Wildlife Rescue Chapter, her specialty caring for orphaned baby mourning doves. These tiny birds have to be fed every two hours, so the rest of the staff were used to hearing them cheep and peep when hungry—in fact, when the Library first started using the barcode reader in Circulation, we all thought Arsell had the baby mourning doves in again! She and her husband have also taken several weeks out of their normal lives and helped build houses for Habitat for Humanity in Oklahoma and Texas.

We expect the Ramans will enjoy retirement with plenty of time to travel—from visiting their four children and seven grandchildren in California, Washington and Oklahoma to more exotic trips. In the past, Arsell has traveled to the Galapagos Islands, India, and various destinations in Europe—including a bicycle tour of Holland. We wish her the very best in the next chapter of her life.

—Ann Redfield