

March 2004

PHYSICS ALUMNI NEWSLETTER

Department of Chemistry and Physics * 100 Campus Drive * Weatherford, OK 73096-3089

Dr. Benny J. Hill returns to SWOSU!

Dr. Benny J. Hill will speak at the 2004 Physics Spring Banquet, Saturday, April 17, 2004, at 7:00 p.m. in the Student Union Ballroom. The topic is "How an Oklahoma Farm Boy became a Physicist, and What He Did With It."

Tickets are \$10 per person. Contact us by April 14 for reservations. (You can pay at the door--we just need a head count so there will be plenty of food!) (Send e-mail reservations to terry.goforth@swosu.edu.)

What's Your Beef?

The 2004 Physics Shish-ke-bab will be held on Saturday, April 24, 2004, in Dr. Robertson's back yard. All attending will be treated to what can only be described as a meal fit for kings. The best shish-ke-bab this side of the Pecos and a ton o' fixin's on the side are on the menu. And with Dr. Robertson's imminent retirement, meat and vegetables won't be the only thing getting skewered! The not-fit-for-prime-time awards are bound to take a turn down into a "black-hole." However, contrary to rumor, these awards will NOT be aired with a five-second delay! Everything is guaranteed to be absolutely live. Alumni, students, faculty, family, and friends should mark their calendars for the best little cookout in Weatherford. (And if you noticed....yes, this is a week earlier than usual. Dr. "There's-No-Such-Thing-As-Black-Holes" will be in Denver the following weekend espousing his views at the APS meeting, so we moved it up.) No reservations necessary, but if you plan to come, letting us know will make sure we have plenty of grub and chairs. (Send e-mail to terry.goforth@swosu.edu.)

Learn from the mistakes of others. You can't live long enough to make them all yourself.

PHYSICS CLUB OFFICERS

Pres: Casey Wells

VP: Ross Gible

Sec: Robert Luebano

Treas: Matt Webb

Publ Rel: Lucas Weber

Historian: Santosh Bhatt

Spn: Dr. Stan Robertson

CoSpn: Dr. Tony Stein

Dr. Robertson to Retire

*** Editor's Note: When Dr. Robertson arrived here in the Fall of 1990, he wasn't exactly a spring chicken. Still, he may not be well known to some of our older alumni, so let's introduce him so that everyone will know what we have had to deal with for the past fourteen years.*

After graduation from Maud (Okla.) High School in 1957, Dr. Robertson worked as an oil field roughneck for several years. Eventually it occurred to him that wrestling pig iron might have a limited future so he enrolled at East Central State College in Ada, Okla. but still supported himself by working the grease trees. He chose to major in Math in college, because it was easy to spell, and then found to his dismay that Physics, which is harder to spell, was a required minor. He responded to this challenge by earning pathetic grades for the first three courses. As fate would have it, enrollments in Physics were so small that he was pressed into service as a paper grader anyway and thus was forced by irate fellow students to learn some Physics. This was reminiscent of an analogous circumstance in high school, by which he had become a running back on the football team. Actually, he was slow enough to be a lineman, but he wasn't big enough.

Always the lucky devil, Robertson married Lois Ward, the prettiest and smartest (excepting this inexplicable lapse) girl on campus in 1962. In his last semester at East Central, Robertson took an independent study course and, with the help of a friend, borrowed some materials from the Physics Dept. Library at Oklahoma University. While returning them, he accidentally stepped on the foot of Prof. Richard G. Fowler, who, after apologies, by happenstance, had a research assistant's position open at the beginning of the next semester. At this point, the unwitting Robertson had become hopelessly ensnared in Physics, where he remains to this day.

After completion of a doctorate in Physics in 1969, Robertson worked for eight years as a physics professor at Fort Hays State University in Hays, Kansas. He left the windy high plains for Tahlequah, Oklahoma and Northeastern State University after his new minnow bucket, complete with minnows and water, blew into Cedar Bluff Lake. (It is rumored that only full professors have a chance against the Kansas winds, not to mention the dreadful lack of woodpeckers in western Kansas.) Three years of Northeastern, Lake Tenkiller and the Cookson Hills were great fun for a young family with five children and a father who was an SPS sponsor and T-Ball coach and awash in new research funds. But when an offer from Oklahoma University arrived in 1980, it was back to Norman along with more little league coaching until the kids were all demonstrably better baseball players than he. This was not to last, however. Oklahoma in 1982 was in tall cotton from a drilling boom and a large pay increase enticed Robertson into a petroleum reservoir engineering job which he held for the next eight years (in the manner of a rat clinging to flotsam of the bust for the last few.) Since arriving at SWOSU in 1990, Robertson has enjoyed serving as the sponsor of the Physics and Engineering Club for many years. He has also

taught many of the engineering oriented courses that we offer as well as electronics and, from time to time, astronomy. A Procrustean approach to research here eventually forced him to publish some quixotic papers dealing with astrophysics, black holes and general relativity. At this point, at least on paper, he is qualified to withstand the winds, but he says that he probably will not give Kansas another chance. After retirement Dr. Robertson plans to fish until that gets terribly, dreadfully, awfully old. If further vexations are needed, there is always golf. Beyond that, there are tin whistles, Irish music and, always, Physics.

Friends, Food, and Anti-Matter Detectors

April 12, 2003, was the date and the SWOSU Student Union Ballroom was the place to be for a very worth-while congregation. Alumni **Jim Bates** ('62), **Ken Duerkson** ('62), **Ron Wollmann** ('73), **Joe Beisel** ('97), and **Stephen Russell** ('99) joined students, faculty, family, and friends of the Physics Program for a delightful evening. Greetings were exchanged, food was consumed and awards were given (more on this later). The evening was capped off by an intriguing presentation about the search for antimatter and dark matter in the universe. **Jim Bates** enlightened and entertained us with an overview of the Alpha Magnetic Spectrometer, a international collaboration which includes NASA. Currently scheduled for an October 2005 launch, the AMS will sit on the main truss of the International Space Station collecting charged-particle components of cosmic rays including "normal" charged particles, positrons, antiprotons and anti-alpha particles. The goals of this project include answering questions about the Big Bang's production of antimatter and exactly what dark matter in the universe really is. (More information can be obtained at the project's CERN Web site ams.cern.ch or at cyclo.mit.edu/~bmonreal.) A hearty "Thank You" goes to Jim for his talk and his support of the Physics program.

Awards...

Eight students were recognized for their hard work and accomplishments at the 2003 Physics Spring Banquet. The first order of business was the annual Sigma Pi Sigma induction ceremony. **Ross Gible**t (Jr, Rocky) was inducted as the 161st member of the SWOSU chapter of the national physics honor society. **Jacob Bass** (Sr, Kingfisher) was named the Outstanding Student in Physics and presented with the J.R. Pratt Award. The 2002-2003 Outstanding Midclassman in Physics Award was given to **Matthew Webb** (Jr, Altus), and **Ross Gible**t was recognized as the Outstanding New Physics and Engineering Club member. Club president **Lucas Weber** (Sr, Weatherford) was honored with the Leadership Award. Four years of hard work paid off as senior **Jacob Bass** was recognized as an honor graduate and presented with a medallion to wear at graduation denoting that status.

...and Rewards

Thanks to the support of our donors, \$3,500 in scholarships were awarded. **Moin Khan** (So, Karachi, Pakistan) received \$1,000 for the J.R. Pratt Scholarship, and **Ross Giblet** received \$1,000 for the Benny J. Hill Scholarship. The Arthur McClelland Memorial Scholarship in the amount of \$500 was given to **Casey Wells** (Sr, Ninnekah). Four Physics Alumni Scholarships, each in the amount of \$500, were awarded to **Santosh Bhatt** (Fr, Kathmandu, Nepal), **Chris Robertson** (Jr, Meeker), **Matthew Webb**, and **Lucas Weber**. These awards make a real and significant difference in the students' progress. As always, we are deeply grateful to alumni, family, and friends of the Physics Program who contribute to the future of the students and the program with their generous support. THANK YOU!

Good judgment comes from experience. Unfortunately, experience usually comes from bad judgment.

Congratulations, Grad!

In May, 2003, **Jacob Bass** (Kingfisher) received his B.S. in Engineering Physics. Interested in a career in medical physics, Jacob is now working at Oklahoma Medical Research Foundation in Oklahoma City. He is using flow cytometers to sort and analyze cells. Fluorescence-stained cells flow through a 70-micron nozzle, are excited by lasers, and then the emitted light is picked up by photomultiplier tubes. Computers analyze the information and select cells suitable for the chosen analysis. The cells are given a charge and diverted accordingly. Way to go, Jacob!

You're the Best!

Want to make a difference in someone's life? Need a tax deduction? Consider it important to "pay it forward?" Enjoy showing your Bulldog Pride? You can do it all at once by donating to the SWOSU Foundation. Rising tuition costs make financial aid for students all the more necessary. You don't have to do it all yourself. Even a small amount can, when combined with other donations, make a big difference in providing assistance to well-deserving students for tuition, fees, books, and other educational expenses. You can send your contributions to us or mail them directly to the SWOSU Foundation. Be sure to specify the account(s) you want to donate to. You may donate to the J.R. Pratt Scholarship, the Arthur McClelland Scholarship, Physics Alumni Scholarships, or the Physics Unrestricted Account. The first three are endowed accounts whose interest may be spent for scholarships. The full balance of the Unrestricted Account is available for scholarships, recruitment, travel, and other approved expenses at the discretion of the physics faculty. (If you want your donation to be available for this year's scholarships, please give to the Physics Unrestricted fund. If you tell us you want it to go to scholarships, we'll be sure to honor your wishes.) On behalf of the students, thank you for your support!

The seven-day week originated in Mesopotamia and was added to the Roman calendar in A.D. 321.

He's Baaa-aaack...

Three years ago we reported that Dr. Ray Jones had retired. We missed him a lot, and apparently he missed us, too. This semester, Dr. Jones returned (temporarily) to teach the Modern Physics Lab. One of Dr. Jones' post-retirement projects has been to finish upgrading the modern physics experiments, and his return allows him to get feed-back on this project and gives the students a chance to have a really great teacher in Modern Lab.

The Sea, Oh the Sea

(Long may it roll between England and Me - - from an old Irish Song)

Well, we don't know about England, but it definitely got between us and the Dominican Republic as we stood on Stewart Beach at Galveston, TX. Nine sturdy physics club members and the sponsor took a day off for a bit of beach volleyball before plunging into Space Center Houston, which is the NASA visitors center, in March 2003. We were fortunate to arrive ahead of a record-setting cold front and have our fun first. By the time we ate the next evening at a restaurant on the ship channel, it had gotten quite cold. (Of course, a few natives accused us of bringing our weather.) The Space Center has cut-away models of the Space Shuttle and many of the spacecraft that have flown over the past forty years. A tram trip over the NASA grounds let us see just how large the Saturn 5 rockets really were as well as providing access to the old Mission Control. One gets a strong sense of historically important times and places on this tour. The electronics and computer technology that got us to the moon seem woefully antiquated by today's standards. Of course, today's standards owe much to things originally designed for use by NASA. Often on the physics club spring tours, we get a glimpse of things to come, such as the Z machine at Sandia National Laboratory, but the looks at where we have been, as seen at the Space Center or the Atomic History Museum in Albuquerque are also illuminating. On balance we had an interesting and informative trip.

While some trips are for fun as well as information, the SPS zone meetings which we attend are primarily devoted to the information side of the ledger. Six students and Drs. Robertson and Stein attended the fall Zone 12 meeting in October at Southern Nazarene University, Bethany, Oklahoma. **Ross Giblett** (Sr., Rocky, OK) presented a talk about his summer research project at North Texas University on Quantum Dots.

Guido's Cat and Canary

I stared at the nearly blank computer screen. It said only, "Galileo Galilei was born in Pisa, Italy, in 1564...." Not a very promising beginning for my article on Galileo, but I found it hard to think. My office was warm, and I was feeling sleepy. Suddenly there was a knock at the door.

"Come in," I called.

Someone did, and it was Galileo himself! He wore the same robe as in the picture I had just looked at, but his beard was a bit scruffy. On the other hand I suppose that he really looked quite well for

someone who had died hundreds of years earlier. "This is a great honor, Sir!" I said as I stood. "I was just reading about you and your work with falling bodies and projectiles."

"I'm just happy that you recognized me," Galileo said. "I suppose that you have some questions for me?"

"Well, I do. Historians are in disagreement, did you really drop cannon balls off the leaning tower of Pisa?"

"Of course I did, and just as I said in my book, the small iron cannon ball hit within a hand's span of the heavier stone cannon ball...and I don't mind telling you it is not easy to measure a hand's span under such conditions. I had a problems with my assistant, Sagredo. He wasn't very agile in dodging cannon balls and was bonked so many times that we had to change his name to Simplicio, or in your terms we changed his name from 'Sage' into 'Simpliton.'"

"Oh, I am so sorry," I said.

"Lighten up professor, that was just a joke."

"Of course it was. Ha! Ha! Changing the subject slightly, if I may, tell me about using a chain to discover that the trajectory of a projectile is a parabola."

"Ah, yes. One of my great inventions! If one takes a board and holds it vertically like a wall, and then puts two nails in it, somewhat far apart but near the top of the board, and the same distance from the top, and then suspends a chain with fine links from these nails, it will sag in the middle and take the shape of an inverted parabola. I always hoped to make a military instrument with this idea so that gunnery officers could use it to calculate the proper amount of powder and the angle of elevation for the cannon-but I was never able to come up with a sufficiently accurate instrument."

"Perhaps, Sir," I ventured, "that was because the hanging chain assumes the shape of a catenary, not a parabola."

"Ah, my good man, that is where the breakthrough came! I was at the estate of my friend Guidobaldo del Monte. His friends call him Guido. Guido had a cat that chased his canary, Figaro, every chance he got. One day we had a pot of blue ink on the workbench, and when the cat was about to pounce on Figaro, Figaro flew into the inkpot to hide. When the cat tried to get him anyway, Figaro splashed ink all over the cat. The poor cat, feeling and looking blue, slunk away in disgrace, but Figaro went berserk! He ran about making little blue canary tracks all over my papers, and then he flew around bumping into walls and leaving blue canary head prints. It occurred to me that I could see the history of his looking for a place to hide by following the marks on the wall.

Guido and I both got the idea that we could cause a projectile to draw its own trajectory! We took a small brass ball and covered it with ink-quite a messy task, I'll tell you. Guido put a sheet of paper on a board and held it up a few degrees off from vertical. Then I launched the ball upward from the bottom of the paper in such a manner that it rolled on the paper and left an ink trace of its path. Being a mathematician, I was able to take some measurements and quickly show that the trajectory was a parabola. The ascending leg was symmetric with the descending leg, contrary to the teachings of Aristotle."

Someone was banging on the door. Dr. Robertson stuck his head in. "Oh, you *are* in here," he said. "The students want to know if you are going to have class. You're five minutes late."

As if he had fled Dr. Robertson's presence, Galileo had vanished. I gathered my lecture notes in a daze. Somehow I didn't think that my editor was going to accept the story about the cat and the canary.

-Dr. Charles Rogers

A day without sunshine is like, night.

Holey War Rages On

New fronts have been opened in the black hole wars by Drs. Stan Robertson and Darryl Leiter. In an article published in *The Astrophysical Journal Letters*, October 20, 2003, they summarized the astrophysical properties of magnetic, eternally collapsing objects (MECO), which they believe may account for everything now known from observations of the various black hole candidates (BHC). In previous work (2002 *ApJ*, V565, p447-) they had shown that most of the BHC spectral and timing properties were consistent with those of intrinsically magnetic objects. This was an unwelcome surprise to many astronomers, because black holes cannot possess intrinsic magnetic fields. Robertson and Leiter later explained (2003 *Found. Phys. Lett.* V16, p143) how MECO could be both magnetic and extremely compact. MECO are considerably more complex than black holes, possessing both internal structure and fields and an interior that is predominately an electron-positron pair plasma. (We could not take the output of the entire earth power grid and produce a cubic micron of a pair plasma!) MECO constitute previously unknown solutions of the field equations of general relativity. It has long been known that matter as dense as neutrons cannot produce a stable star in excess of about three solar masses, but it is an unwarranted assumption that the collapse of more massive objects must produce a black hole. MECO, as the "EC" implies, just continue to collapse to such a redshifted state that it slows to a crawl to external observers. Relativistic life becomes bizarre.

The second front of the battle opened in early February with the acceptance of an article to be published in 2004 *Monthly Notices of the Royal Astronomical Society*. In this article, Robertson and Leiter showed that the magnetic MECO can interact with an accretion disk to produce jet outflows. The MECO model produces a quantitative accounting of the radio and x-ray luminosities of the disk, jet and central object. It correctly predicts the scaling of these luminosities with mass of the central object, whether a stellar mass BHC or a galactic nucleus BHC. Neutron stars are also magnetic and the magnetic model also correctly predicts the luminosities for neutron star disk/jet systems. It has long been known that there are only subtle and minor differences between neutron star and stellar BHC systems, but explanations which invoke black holes automatically fail for neutron stars. The issue of whether or not any of the BHC actually harbor black holes will ultimately be settled by determining whether or not their central objects are magnetic. The MECO model has shown that all of their properties can be explained on the assumption that they are intrinsically magnetic. If not intrinsically magnetized, then BHC would have to produce the magnetic fields responsible for the synchrotron emissions of jets within the jet or in an accretion disk. Current simulations of accretion disks and jets are unable to account for the fields and outflows with event horizons at the center.

If everything seems to be going well, you have obviously overlooked something.

Where Are They Now?

Sarah King ('99) is working at Burgess and Niple, Ltd. in Lexington, KY. She is drafting roadway plans for civil transportation.

Scott Taylor ('97) is a Senior Technical Professional working as a logging engineer for Haliburton in Saudi Arabia.

Dan Rogers ('73) teaches Pre-Engineering and Manufacturing Technology for Metro Technology Centers at the South Bryant Campus in Oklahoma City.

Terry Cox ('86) is a Software Engineer for Seimens Transportation Systems in Minneapolis, MN. He's currently working to upgrade the Rail Traffic Control system for the CN railroad in Canada which has control centers in Edmonton, Toronto, and Montreal.

Ann Williams ('97) is working for the Boy Scouts of America in Oklahoma City.

Wayne Muncy ('66) is stateside again, living in Southlake, TX.

Paul Schneider ('97) is attending medical school at the Texas College of Osteopathic Medicine in Fort Worth, TX.

Kevin Johnson ('93) has returned to Oklahoma. He is now practicing medicine in Clinton.

Missey (Dubiel) Gard ('90) is working for NASA at the Johnson Space Center in Houston. When we last heard, she was the mission manager for the International Space Station Expedition 6 last spring.

Aaron Gilmore ('01) interned as a Mechanical Engineer for the Department of Defense at the Ammunition plant in McAlester last summer.

The early bird may get the worm, but the second mouse gets the cheese.

KEEPIN' IN TOUCH

We hope you enjoy reading the newsletter just half as much as we enjoy putting it together for you. But to send you one, we have to know where you are. Please keep us up on your current address. It's easy, just mail it (snail or e-), call us, or fax us. We also appreciate information like who you work for, your job title, promotions, or anything else you'd like to share with us. But CAUTION: If you send an update to the SWOSU Alumni Association, we DO NOT automatically receive that information. (Hey, we didn't make the rules!) So, send us a copy, or e-mail us so we know to ask them for the update.

WE'RE WAITING TO HEAR FROM YOU!!!

Drop us a line at 100 Campus Drive, Weatherford, OK 73096-3098, or e-mail (*note the new e-mail addresses!*) or call us at

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Don't want to keep track of all that? Just send your e-mail to physics@swosu.edu and we'll see that it gets to the right person(s).

ALUMNI e-mail ADDRESSES

If you are a SWOSU Physics Alumnus, drop us an e-mail at physics@swosu.edu and we'll send you the complete list of alumni e-mail addresses that we have on file.