

PHYSICS NEWSLETTER

Volume 2, Issue 1
September/October 2007

DR. LINDA OLAFSEN MAKES CONGRESSIONAL VISIT

On May 1-2, Dr. Linda Olafsen, Associate Professor of Physics, traveled to Washington, D.C. to express to Congress the need for increased and balanced federal investment in research and development and the fact that federally funded research is critical to securing the nation's economic future. Linda Olafsen and approximately 30 members of the Materials Research Society joined with



Dr. Linda Olafsen meets with Representative Chet Edwards

nearly 300 scientists, engineers and business leaders who made visits on Capitol Hill as part of the eleventh annual "Congressional Visits Days," an event sponsored by the Science-Engineering-Technology Work Group.

While visiting Congressional offices of Senator Kay Bailey Hutchison and Representative Chet Edwards, Linda Olafsen, along with Professors Harvey Abramowitz of Purdue University-Calumet and Dvora Perahia of Clemson University, discussed the importance of the nation's broad portfolio of investments in science, engineering and technology to promoting national security, prosperity and US leadership in competitiveness and innovation. Most importantly, they provided a constituent perspective on the local and national impact of these programs and their significance to Baylor University and central Texas. Dr. Olafsen and her team also spoke about the impact of basic research in materials and physical science on now common items such as cellular phones and on the potential for future research to lead to clean energy alternatives to coal plants.

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Special points of interest

- Texas APS Fall Meeting
October 18-20
- Undergraduate Study Area Opens in E-wing
- NSF REU @ Baylor
- B.F.L. Ward honored for Quantum Gravity essay
- Calendar of Events for September & October

AND NOW A WORD FROM THE CHAIR ...

September 2007

Dear Friends,

Baylor University
PHYSICS



Greetings from the Baylor Physics Department! Classes are now back in session, and professors have returned from summer research and teaching activities. This fall our Department is pleased to welcome twelve new undergraduate majors and nine new graduate students. Ed Schaub is welcomed back, this time as a (permanent) Lecturer. Ed has been teaching introductory courses, our sound and acoustics course, and our electronics laboratory course in the Department for many years. We hope that his permanent appointment is even longer than his temporary one (20 years)! Tibra Ali is a new Lecturer teaching introductory courses and assisting with tutorials in our calculus-based courses. Tibra previously had a postdoctoral appointment in the Department.

Since I last wrote to you there have been new developments in several areas. We have completed the move of laptop computers into the graduate student area, and have installed a new printer for graduate student use. The new Undergraduate Study Area was completed in May—just in time for our summer REU students to enjoy. In addition to computers, printer, and workspace, the study area also has a rug, sofa, and comfortable chairs designed for in-depth physics conversations! Dr. Ariyasinghe's new lab was completed over the summer—finishing out all of the laboratory space in our third-floor research wing (but we have more assigned space on the first floor of the Baylor Sciences Building).

New course numbers are in effect this fall. The old PHY 1425-2435 sequence for physics majors has been replaced by PHY 1420-1430. The thinking was that 1000-level labeling would convey the idea that majors should take both courses their freshman year. Apparently that idea did not get across to the university advisors who register freshman during summer orientation: they had registered only half of our new physics majors in physics courses!

Our PHY 1420 and 1430 courses also have a new component this year. Students must sign up for three parts: lecture, laboratory, and a separate weekly one-hour tutorial. We have fully implemented the University of Washington plan for enhancing undergraduate physics education. We are hoping that the tutorials will have a huge impact on the understanding of basic physics concepts.

We again thank you for your interest and support. Please continue to pray with us that we honor God in all of our work, and that we accomplish goals that are pleasing to Him.

With warmest best wishes,

Greg Benesh

Professor & Chairman



Greg Benesh, Chair of Physics

Texas APS Fall Physics Conference to be held Oct 18-20.

The Texas Section of the American Physical Society (TSAPS) will be holding its Fall 2007 meeting at Texas A&M Oct 18-20 at Texas A&M. The conference is held jointly by TSAPS, TSAAPT, and SPS zone 13. In recent years the conference has also been supported by the APS Forum for Industrial and Applied Physics (FIAP), and the National Societies for Black and Hispanic Physicists (NSBP and NSHP).

The local organizers at Texas A&M, lead by Dr. Roland Allen, with support from the Mitchell Institute, have organized an excellent conference with an outstanding list of Invited speakers:

- **Dudley Herschbach, Harvard University and Texas A&M University**
"The Second Einstein Centennial"
- **Douglas Osheroff, Stanford University**
"How Advances in Science Are Made"
- **Helmut Katzgraber**
"The Physics of Diving"
- **Oscar Vilches, University of Washington**
"One, Two, and Three Dimensional Physics with Films Absorbed on Carbon Nanotube Bundles"
- **Banquet Presentation -Fred Jerome and Rodger Taylor**
"Einstein on Race and Racism"
- **Laura Smoliar, CEO and Founder of Mobius Photonics, Santa Clara, CA**
"Industrial Physics"
- **Keith Baker, Yale University**
"Exciting Prospects and New Experiments in both High Energy and Nuclear Physics"
- **Vy Tran**
"The Great Observatories: New Windows into the Universe"
- **Casey Papovich**
"Probing the Universe in the Infrared with the Spitzer Space Telescope"
- **Lucas Macri**
"How to Measure the Age of the Universe"



Along with the invited speakers typically 100 to 150 contributed talks and posters are presented. Also, TSAAPT sponsors teaching workshops specializing in demonstrations and new lab equipment.

The deadline for abstract submission is September 28th. Early registration ends Oct. 5th.

In recent years the conference attendance has been between 250-300. This is a great time for getting to know physicists from throughout Texas and for presenting your own research. Texas has a great and supportive Physics community with an interest in strong research and welcoming students into the field. The Fall Joint meeting is rapidly becoming one of the largest regional conferences sponsored by APS. More Information and instructions for registration and abstract submission can be found at the conference website.

<http://txaps07.physics.tamu.edu/>

Note that students have reduced rates on registration and meals with a FREE lunch on Friday. Students who present a talk or poster as part of the APS venue are eligible for travel stipends and may enter a competition for outstanding presentations. Dr. Dwight Russell, President of the Texas section this year, wants to encourage students in particular to take advantage of the great opportunity.

If you have additional questions about the conference please contact Dwight Russell x2273.

MSSM Strings part III by Jerry Cleaver

Editor's note: This is the third and final part of Professor Cleaver's overview of String theory for the department newsletter. In order to deliver this last portion in its entirety, the references cited are listed in an addendum on page 6.

The Standard Model (SM) is truly one of the most outstanding theoretical and experimental achievements of the 20th century. Nevertheless, the very nature of the SM begs the question of what more unified, self-consistent theory hides behind it. "Why" is the SM as it is? The details of the Standard Model cannot be explained from within. A deeper, underlying theory is necessary. String Theory proposes viable answers to these questions. While the developing concept of a string landscape has significantly diminished hopes of locating *the* unique string vacuum that either resolves *all* the "Why's" of the SM (by postdiction) in its low energy effect field theory limit, or is eliminated as a viable theory by experimental disconfirmation. Instead, string theory in its present form responds to these questions not with a single unique answer, but with a collection of viable answers, all of a geometrical or topological nature. Just as a given Lie algebra has an infinite set of representations, so too the underlying physical laws within string theory may well have a vast array of different representations, of which our observable universe is but one.

Several hundred years ago the debate was over a geocentric universe versus a heliocentric universe and heliocentric won out. Eventually the heliocentric perception was, itself, supplanted by a "galactocentric" view. Then during the first half of the prior century Edwin Hubble proved how limited the latter outlook was also. Galactocentric was replaced by "univercentric" Perhaps String Theory is taking us to the next step of realization, that our universe may be but one of many. That is, to understand the "why" of our universe and its laws, we may need to look to a multiverse (a vast collection of universes) beyond ours. String theory may well be teaching us today that a "univercentric" view is as outmoded today as the geocentric view was realized to be long ago.

Whether ultimately, String Theory predicts but one possibility for a consistent universe (if the landscape picture eventually collapses) or vast array, string theory clearly must predict *at least* our observable universe as a possible outcome. To prove that string theory allows for the physics of the observable universe is the mission of string phenomenology. String phenomenologists are pursuing this investigation from many fronts. As mentioned in Part II of my discussion, (MS)SM-like models have now been realized from weak coupled heterotic models via both free fermionic and orbifold constructions, strong coupled heterotic models on elliptically fibered Calabi-Yau's, Type IIB orientifolds with magnetic charged branes, and Type IIA orientifolds with intersecting branes.

A string derived (MS)SM must possess far more realistic features than just the correct gauge forces and matter states. Also required for the model are realistic gauge coupling strengths, a correct mass hierarchy, a viable CKM quark mixing matrix, a realistic neutrino mass and mixing matrix, and a severely suppressed proton decay. The hidden sector must be sufficiently hidden. MSSM candidates must also provide viable non-perturbative supersymmetry breaking that yields testable predictions for supersymmetric particle masses. Finally, the physical value of the cosmological constant must be produced. No current string-derived (MS)SM models are a perfect match with the (MS)SM, but significant progress had been made in the last decade.

The first step in proving that the MSSM can be realized in string theory was accomplished when A. Faraggi, D. Nanopoulos and I constructed a string model that yields exactly the matter content of the MSSM in the observable sector, with no MSSM-charged exotics. This was shown in the context of a weak coupled heterotic model constructed in the free fermionic formalism [5-9]. Glimpses of other necessary phenomenology were also shown by our model. Generational mass hierarchy appears as an ubiquitous effect of vacuum expectation values of scalar fields induced via Abelian anomaly cancellation, a feature endemic to all quasi-realistic heterotic models. Following our model, several additional MSSM models, also without exotic MSSM-charged states, were constructed by alternate means. A representative sample of these included the heterotic $Z'_6 = Z_3 \times Z_2$ orbifold of Buchmuller, et al. [13]; the heterotic elliptically fibered Calabi-Yau's of [14,15,16]; the Type IIB magnetic charged branes of [17] without flux, and those of [18,19,20,21] with flux; and the Type IIA intersecting brane models of [21,22].

These examples showed several (differing) areas of progress toward more realistic phenomenology. For instance, some models reconfirmed the importance of a local anomalous Abelian symmetry and the related flat direction VEVs, resulting from the Green-Schwarz-Dine-Seiberg-Witten anomaly cancellation mechanism [23,24]. These VEVs invoke many necessary features of an MSSM: observable sector gauge breaking to $SU(3)_c \times SU(2)_L \times U(1)_Y$, decoupling of MSSM exotic matter, production of effective Higgs μ -terms, and formation of intergenerational and intra-generational mass hierarchy.

The greatest advancement was in the role of branes and anti-branes, especially with regard to supersymmetry breaking and moduli stabilization. Brane-based MSSM-like models with stable supersymmetric anti-deSitter vacua have been constructed. Further, uplifting from stable anti-deSitter vacua to metastable deSitter vacua with cosmological constants at a viable scale has been crafted into MSSM-like models by the addition of antibranes. In the years ahead further realistic features of string models containing the (MS)SM gauge group, solely the three generations of (MS)SM matter and a Higgs pair will likely be found, as string phenomenologists continue to analyze the content of the string landscape.

A SPECIAL WELCOME FOR NEW STUDENTS ...

Welcome to Baylor for the 2007-2008 school year! Not all members of the physics faculty are able to have freshman physics majors in class this semester, but we do want to get to know you, give you a chance to meet us, and let you know about the rainbow of opportunities for you to get involved in the Physics Department.

You should have received an invitation to our annual **Physics Picnic** which will be **Friday, September 7th**. This will give you a chance to meet other physics majors, graduate students, as well as faculty. And the food is usually pretty good, too!

The **Society of Physics Students** (SPS) meets about once a month throughout the school year. SPS represents the physics department at several events on campus, volunteers at the Physics Circus and other service opportunities, and is in charge of planning our annual Christmas party and Senior Recognition Banquet in the spring. You will be hearing soon from the SPS president, Matt Benesh, about the upcoming meetings.

Everyone in the Physics Department has their **picture** posted in the glass cases outside the Physics Office. This is a great way to learn the names of other undergraduates, graduate students, faculty, and staff. We need a picture of **you** to complete our display. You can either send Dr. Matthews a picture of yourself (e-mail or hard copy) or contact her to have your picture taken. We'll also be taking pictures of everyone at the Physics Picnic.

SPS also sponsors *Doughnut Fridays*. Each Friday from 8:30 to 9:30 am we have coffee, doughnuts, and kolaches in the Physics Conference Room (BSB D.311). All physics majors, graduate students, and faculty are invited for an informal get-together before or after class (depending on your schedule).

You will have several opportunities to get involved with **physics research** projects as you progress through your classes. As freshmen, we would encourage you to learn what areas are available by talking with faculty members and other students. Many members of the faculty work extensively with undergraduates, giving the students experience not only in conducting research, but also in writing papers and presenting at national conferences. More info will be coming soon!

There is also a full schedule of **physics seminars** throughout the school year. These are given by physics students, faculty and guest speakers. Graduate Colloquium meets Fridays at 3 pm. The first seminar on **Friday, August 31**, was given by several of our undergraduates in BSB E.125. They gave overviews of the research they did this summer. Later colloquia will be presented on various topics by graduate students. The Physics Department Colloquia are Wednesdays at 4 pm in BSB E.125 and feature several outside speakers as well as highlighting the research of our own faculty. Several research groups also have their own seminar series, so be watching for announcements.

We hope to see each one of you many times throughout the semester!

Please contact Dr. Lorin Matthews (Lorin_Matthews@baylor.edu, phone 710-2279) or Dr. Jay Dittmann, the advisor for undergraduate physics majors (Jay_Dittmann@baylor.edu, phone 710-2275), if you have any questions.

HAVE YOU NOTICED THE NEWSLETTER CALENDAR?

On the back page of the newsletter, students and faculty may find the newsletter calendar to be of particular usefulness. Summarized as best as possible, many of the numerous dates and deadlines that are brought to the editor's attention can be found for the next two months on the calendar. When the call for newsletter items goes out, please bring to mind any important dates and bring them to the editor's attention so that they may be included for everyone's benefit. While it is not possible to list all of the deadlines in such a small space, you are of course welcome to annotate your own hardcopy of the newsletter to include any additional dates, such as the forthcoming due date of the next Vasut child (estimated for the middle of September).

UNDERGRADUATE STUDY AREA OPENS ...



Outfitted with workstations, carpet, desks, comfortable chairs and a coffee table, the department christened its new undergraduate study area this year. Located in room E.340, the Undergraduate Study Area is a place for our majors to congregate and focus intensely on their studies as well as to become an integral part of our departmental community.

MSSM Strings part III by Jerry Cleaver (*the references*)

- [13] W. Buchmuller, K. Hamaguchi, O. Lebedev and M. Ratz, Phys. Rev. Lett. 96 (2006) 121602 (2006).
- [14] V. Braun et al., JHEP 0605 (2006) 043; JHEP 0412 (2004) 62; Phys. Lett. B618 (2005) 252; JHEP 0506 (2005) 39; JHEP 0604 (2006) 019; JHEP 0603 (2006) 006; JHEP 0606 (2006) 32; JHEP 0607 (2006) 35.
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- [18] J. Cascales, et al., JHEP 0402 (2004) 031.
- [19] J. Kumar and J. Wells, JHEP 0509 (2005) 067.
- [20] M. Cvetič, et al., Phys. Rev. D71 (2005) 106008.
- [21] C. Chen, et al., Nucl. Phys. B732 (2006) 224.
- [22] M. Cvetič, et al., Phys. Lett. 87 (2001) 201801.
- [23] M. Dine, N. Seiberg, and E. Witten, Nucl. Phys. B289 (1987) 589.
- [24] J. Atick, L. Dixon, and A. Sen, Nucl. Phys. B292 (1987) 109.

PHASE TRANSITIONS

Greg Benesh named to new term as Chair of the Department of Physics

From the recent email from Dean Lee Nordt of the College of Arts & Sciences:

Physics Faculty:

I am pleased to announce that based on your overwhelming and enthusiastic recommendation, Dr. Greg Benesh is being appointed to a three-year term as chair of the Department of Physics effective August 15, 2007. Recall that we will conduct a national search near the end of Dr. Benesh's term. I greatly appreciate your honest and thoughtful comments on this important matter. I sincerely look forward to working with Dr. Benesh and your department in the future.

Walter Wilcox assumes role as Department Graduate Program Director

Dr. Walter Wilcox succeeds Dr. Ken Park as the new Graduate Program Director in the Department of Physics. Walter assumed the duties on June 1, after a three year term by Ken. "(Ken) has set a standard I hope I can merely approach" said Dr. Wilcox. As a department, let's help both Walter and Ken as they each make their own transitions with this very important role in physics.

Ed Schaub becomes permanent lecturer

After 20 years of service to the department as a temporary lecturer, Dr. Ed Schaub has accepted a position with the department as a permanent lecturer. Dr. Schaub teaches our PHY 1407 (Sound and Acoustics) and PHY 2135 (Basic Electronics Laboratory) courses as well as classes from our introductory sequences.

Tibra Ali joins the department as temporary lecturer

Dr. Tibra Ali made the transition from postdoctoral fellow to temporary lecturer in our department over the summer. Tibra will be teaching the calculus-based introductory physics sequence as well as overseeing the department's full implementation of the University of Washington tutorials into the calculus-based introductory physics sequence. After a trial year of hybrid laboratory and tutorial sessions, the department expanded the tutorials into their own timeslot separate from the laboratory portion of the introductory calculus-based physics sequence.

Physics courses are renamed

The introductory calculus-based physics sequences have been renamed PHY 1420 and PHY 1430, replacing the prior courses of PHY 1422, PHY 1425 and PHY 2435. In addition, PHY 2340 has been repackaged as PHY 2360, Mathematical and Computational Physics. Finally, PHY 2370 has been repackaged as PHY 2350, Modern Physics. The changes are, in part, to bring the numbering of the sequence for majors into a more consistent and logical order.

Rui Wu defends masters thesis

Rui (Ray) Wu defended his master thesis successfully on 8/30. The title of his thesis is "Gravitational Collapse and Formation of Black Holes in the Brans-Dicke Theory of Gravity with $(2+1)$ Dimensions." Ray is going to study for another masters degree in statistics at UT San Antonio.

Remember in your prayers ...

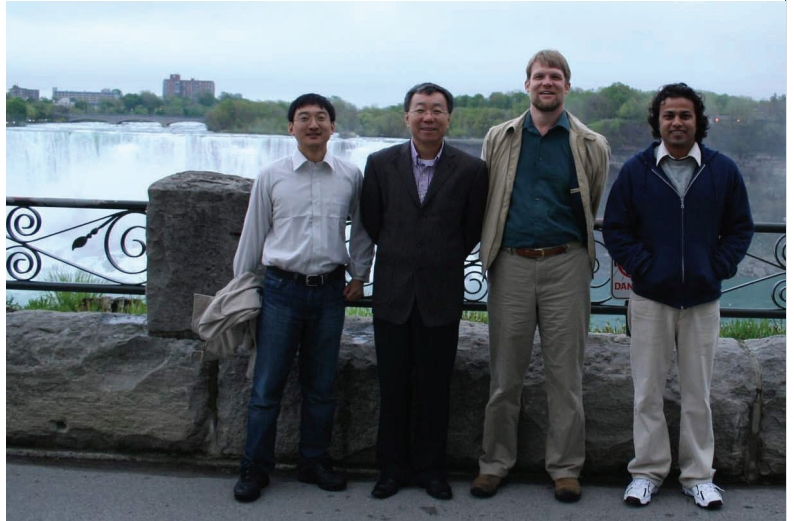
Drs. Jeffrey and Linda Olafsen had the opportunity to travel shortly after the end of the spring semester. In addition to seeing friends and family, the Olafsens had the privilege of visiting several colleagues in the department of Physics on the campus of Virginia Tech. We ask that you remember these faculty and students in your prayers in the wake of the events last spring. In our conversations with these colleagues, the common answer is that they are "physically fine," implying of course that the deeper mental and emotional healing is an ongoing and continuing process.



THE DEPARTMENT IN PICTURES ...



Zayn Matthews, 6 lbs. 19" long, born June 26, 2007



Anzhong Wang, Gerald Cleaver and students Preet Sharma (right) and Qiang (Bob) Wu (left) at Niagara Falls

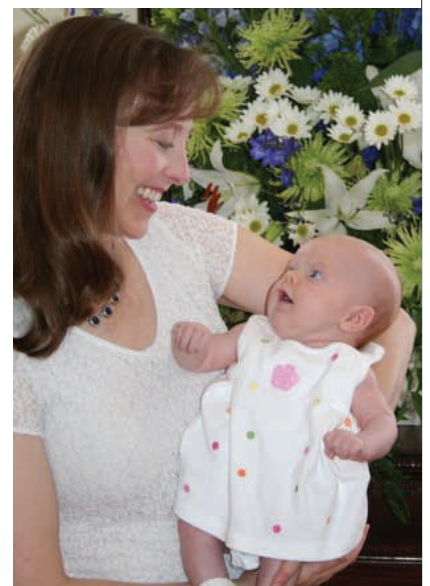


Above: James Creel, Jorge Carmona, Ke Qiao, Truell Hyde and Jimmy Schmoke during a meeting break in Albuquerque, NM.

Yumei Wu and colleague in Rio (photo by Anzhong)

Jay Dittmann on a photo break during a meeting in Helsinki

A more recent pic of Lorin & Zayn



PRESENTATIONS ...

Walter Wilcox

"Deflation Methods in Fermion Inverters", the XXV International Symposium on Lattice Field Theory ("Lattice 2007"), Regensburg, Germany, to be published in Proceedings of Science. (This was the plenary talk. It is on-line at the conference site: http://www.physik.uni-regensburg.de/lat07/pages/program_plenary.php)

"Deflated BiCGStab for Linear Equations in QCD Problems", with Ron Morgan and Abdou Abdel-Rehim, poster presentation, the XXV International Symposium on Lattice Field Theory ("Lattice 2007"), Regensburg, Germany, to be published in Proceedings of Science.

"Vacuum Expectation Values of Twisted Mass Fermion Operators", with Randy Lewis (Regina University) and Abdou Abdel-Rehim, poster presentation, the XXV International Symposium on Lattice Field Theory ("Lattice 2007"), Regensburg, Germany, to be published in Proceedings of Science.

"Magnetic Moments of Vector Mesons in the Background Field Method", with Frank Lee (George Washington University), poster presentation, the XXV International Symposium on Lattice Field Theory ("Lattice 2007"), Regensburg, Germany, to be published in Proceedings of Science.

B. F. L. Ward

In Taiwan and LP07 in Daegu, S. Korea, Dr. B.F.L. Ward and his research group presented two talks in Taiwan, one at the Academia Sinica and one at the National Center for Theoretical Sciences, and had contributed seven papers to LP07. In the lecture at Academia Sinica, Dr. Ward and his group presented the latest developments in their new UV-finite approach to quantum general relativity, see, for example, <http://www.arxiv.org/abs/hep-ph/0610232>. Dr. Ward was pleased that this paper won Honorable Mention (it was rated as one of the top 35 papers among the many hundreds submitted world-wide in the year-long competition) in the Gravity Research Foundation Essay competition which ended in spring, 2007. Please see the next page (Page 10) for the related story on this honor.

CASPER

Charging of Fractal Dust Agglomerates in a Plasma Environment L.S. Matthews and T.W. Hyde, presented at the 34th IEEE International Conference on Plasma Science (ICOPS), Albuquerque, New Mexico (2007).

Particulate Contamination and Its Niche Within Complex (Dusty) Plasmas J. Creel, J. Carmona-Reyes, J. Kong and T.W. Hyde, presented at the 34th IEEE International Conference on Plasma Science (ICOPS), Albuquerque, New Mexico (2007).

Structural Symmetry and Vertical Modes in Finite 2D Plasma Crystals K. Qiao and T.W. Hyde, presented at the 34th IEEE International Conference on Plasma Science (ICOPS), Albuquerque, New Mexico (2007).

Dust Particle Oscillations in a Wakefield Potential J. Kong and T.W. Hyde, presented at the 34th IEEE International Conference on Plasma Science (ICOPS), Albuquerque, New Mexico (2007).

Vertical Dust Particle Chains Mass and Charge Measurements J. Carmona-Reyes, J. Kong, J. Schmoke, Mike Cook and T.W. Hyde, presented at the 34th IEEE International Conference on Plasma Science (ICOPS), Albuquerque, New Mexico (2007).

PUBLICATIONS ...

Anzhong Wang and Yumei Wu

A. Wang and Y. Wu, *Gen. Relativ. Grav.* 39, 663-676 (2007) [arXiv:gr-qc/0506010].

Y. Gong and A. Wang, *Phys. Lett.* B652, 63-68 (2007) [arXiv:0705.0996].

Y. Gong, B. Wang, and A. Wang, *Phys. Rev.* D75, 123516 (5 pages) (2007) [arXiv:gr-qc/0611155].

Z.-H. Li and A. Wang, *Mod. Phys. Lett.* A22, 1663-1676 (2007) [arXiv:astro-ph/0607554].

Y. Gong, A. Wang, Q. Wu, and Y.-Z. Zhang, *JCAP*, 07, 018 (12 pages) (2007) [arXiv:astro-ph/0703583].

Ken Park

A Scanning Tunneling Microscopy Study on the Effect of Post-Deposition Annealing of Copper Phthalocyanine Thin Films, K. Manandhar, K.T. Park, T. Ellis, Z. Song, T. Cai, and J. Hrbek, *Surf. Sci.* 601, 3623 (2007).

Re-oxidation of TiO₂(110) via Ti interstitials and Line Defects, K.T. Park, M. Pan, V. Meunier, and E.W. Plummer, *Phys. Rev. B* 75, 245415 (2007).

Jeffrey Olafsen

G. W. Baxter and J. S. Olafsen, "Experimental Evidence for Molecular Chaos in Granular Gases." *Physical Review Letters*, 99, 028001 (2007).

NSF REU & RET @ BAYLOR

REU and RET Summer Program

Sponsored by the National Science Foundation, CASPER, and the Department of Physics

The Physics Department was a lively place this summer with thirteen undergraduate students and five teachers doing research as part of the 14th NSF REU (Research Experience for Undergraduates) and RET (Research Experience for Teachers) programs. The students and high school and middle school teachers experienced the trials and tribulations of doing research on a variety of theoretical and experimental projects under the direction of Dr. Truell Hyde, Dr. Lorin Matthews, Dr. Jeff Olafsen, Dr. Linda Olafsen, Dr. Jay Dittmann, Dr. Dwight Russell, and Mr. Dick Campbell. The most challenged were those doing astronomical research at the Turner Observatory, as our unusually wet summer provided very few nights without cloud cover.

Students, teachers, faculty, graduate and undergraduate students participating in summer research attended the weekly Wednesday Lunch Bunch Seminars and the Friday Updates, always popular because of the free food. At the Wednesday seminars, faculty members presented short talks on various topics of interest to physicists, including how to build trebuchets, modeling protein folding, and why Charlie, from the television series "Lost", shouldn't have drowned. Each Friday the participants gave updates on their research experience and were given tips on literature searches, writing papers, preparing posters and power point presentations and applying to graduate school.

At the end of the summer, each of the participants prepared a poster, gave a twelve-minute presentation, and wrote a paper detailing their research and results. The program culminated with a dinner and awards presentation at The Palladium.



BAYLOR DISTINGUISHED PROFESSOR HONORED

Editor's note: This story was taken from a Baylor press release authored by Matt Pene

Dr. Bennie F.L Ward, distinguished professor of physics at Baylor University, has received an honorable mention in an international essay competition conducted by the Gravity Research Foundation.

The year-long competition seeks "the most pioneering essays in research on the subject of gravitation, its theory, application or effects."

"Resummed Quantum Gravity" presents a new solution to the famous problem that Albert Einstein could not solve - the union of the quantum mechanics theory of Bohr and the fundamental general theory of relativity by Einstein. "I am excited and honored to have been recognized in this exceedingly strong competition," Ward said. "The recognition shows that Baylor's physics department is creating physics on the cutting-edge, something essential for any physics department that hopes to become a top-tier department."

Graduate & Undergraduate Colloquia, Fall 2007: Fridays, 3 PM

Date	Speaker 1	Speaker 2
8/24/2007	Introduction/Organization	
8/31/2007	Undergraduate Summer Research Presentations	K. Combs, M. Benesh, J. Jantzi, S. Runhau and P. Vo
9/7/2007	Physics Department Fall Picnic	
9/14/2007	University Faculty meeting	
9/21/2007	Kristen Pechan	Timothy Renner
9/28/2007	Qianyu (Theresa) Ma	Angela Douglass
10/5/2007	Zhenbin Wu	Zhuanhao Zhang
10/12/2007	Fall Break	
10/19/2007	James Creel	Jay Murphree
10/26/2007	Alexander Price	Yongqing Huang
11/2/2007	Jessica Norcia	Te Ha
11/9/2007	Karen Bland	Preet Sharma

OUT AND ABOUT ...

Dr. Walter Wilcox recently attended the lattice QCD conference in Regensburg, Germany (July 29-Aug.4) where he was asked to give a 45-minute plenary talk on Saturday, August 4. This was a significant honor. The title of the talk was "Deflation Methods in Fermion Inverters". Ron Morgan (Baylor Mathematics Department) and Walter have had a joint NSF grant for the past 4 years. Walter covered the work that Ron and he have done in the field, plus two other recent papers (one from a group at William and Mary University and another from an individual at CERN) also giving techniques for deflation.

In Dr. Linda Olafsen's Semiconductor Laser Optics Laboratory, three students were hard at work this summer studying electrical and optical properties of infrared emitters. University Scholar Windrik Lynch continued his work in the lab, which is developing into his undergraduate thesis work. Dr. Daniel Mixson, from Naval Academy Preparatory School in Newport, RI, was a participant in the Research Experience for Teachers (RET) program, and measured current-voltage curves and beam shapes for infrared light emitting diodes. This work is seminal in an investigation of mid-infrared laser beam quality being performed through Baylor's Faculty Research Investment Program in collaboration with Dr. Jeffrey Olafsen. Incoming Ph.D. student Angela Douglass joined the group in July and immediately began contributing to the research projects in the lab.

Nan-hsin "Nancy" Yu traveled to the Center for Nanophase Materials Sciences in Oak Ridge National Laboratory and spent two months (July and August) working with the CNMS scientists to investigate the nanoscale defects of transition metal oxides and their role in the formation of nanoparticles. She has developed her expertise in etching the STM tips that would produce atomic resolution in images.

Kedar Manandhar had a son born to his family past July. Both the mother and the son (and of course the father) are doing well.

Dr. John Vasut had an opportunity to do a two-day study of pulmonologic physics, specifically the study of a pneumothorax (collapsed lung) at the end of the spring semester. In preparation for this study he literally coughed up a lung while giving his final exams. This coughing pushed air into his pleural cavity via a small defect in the lining of his lung. The increase in pressure in the cavity totally collapsed the right lung and put pressure on the vena cava and heart as well. During his stay at Hillcrest a chest tube was inserted and the lung successfully re-inflated. During his time at Hillcrest, Dr. Vasut also had the opportunity to go on several tours of the radiology department and examine both the old and new CT scanners in the department. This study showed that collapsing a lung does seem to substantially eliminate violent coughing (presumably collapsing both lungs would be even more effective in this regard). However, Dr. Vasut does not recommend this method of cough suppression. This work was supported by benefit funds provided by Blue Cross/Blue Shield and Baylor University. *Editor's note: Kudos to John's attempt to make the cover of the newsletter two issues in a row!*

Dr. Jerry Cleaver was invited to present a 30-minute plenary lecture at the Tenth European Meeting Planck'07 held in Warsaw, Poland, June 9-13, 2007. The conference, nicknamed Stuartfest, was held to honor the 60th birthday of Dr. Stuart Raby, who was Jerry's postdoctoral mentor at The Ohio State University from 1993 to 1996. Jerry was a featured speaker and "scientist in residence" at the Evangelical Lutheran Church of America's 2007 Summer Theological Institute, entitled Faith and Faithfulness: Christianity in the Age of Scientific Discovery, at Texas Lutheran University, July 9-13, 2007. Along with Dr. Anzhong Wang and two of their students, Jerry also attended the Origins of Dark Energy conference, in Hamilton, Ontario, Canada, May 14-17. Jerry dedicated some of his summer time to developing the themes of and speakers for a 3-day symposium, entitled String Theory and the Multiverse: Philosophical and Theological Implications, to be held summer 2008 at Wheaton College in Illinois. Jerry was invited to organize the symposium with the Chair of the Wheaton Physics Department, Stewart DeSoto. On campus this summer Jerry continued Strings Theory research with postdoctoral researcher Dr. Tibra Ali, Ph.D. students Matt Robinson and Tim Renner, and REU student Jared Greenwald. In July, Jerry received "Honorable Mention" for his CTNS/Templeton Foundation's Science and Transcendence: Advanced Research Series (STARS) grant application, entitled String Theory, the Multiverse Hypothesis, and God, which was jointly written with Dr. Robin Collins, Department of Philosophy, Messiah College.

This fall Dr. Anzhong Wang will be on a one-semester research leave in Rio. Doing research all semester. Never going outside. Really.

Dr. Jeffrey Olafsen has been invited to present a talk at the symposium/workshop tentatively titled, "Complexity in materials far from equilibrium" which will be held in the middle of May 2008 on the campus of Virginia Tech. Dr. Olafsen spent his summer supervising three undergraduate students, Kristin Combs, Jacob Jantzi and REU fellow Corey LaFontaine in constructing several experiments for the new nonlinear and non-equilibrium dynamics laboratory. Kristin was supported by funds from the University Research Committee.

Dr. Anzhong Wang's postdoctoral fellow, Dr. Yungui Gong, terminated his two-year term in May 30, and went back to China with his family.

Dr. Jay Dittmann described recent high energy physics measurements in an invited plenary talk entitled "Jet Physics at CDF" at the Workshop on Low-x Physics in Helsinki, Finland, from August 29 to September 1. At the conference, Dr. Dittmann also led a discussion session on hadronic final states.

Dr. Nils Krumnack, a postdoctoral research associate working with Dr. Dittmann in the High Energy Physics group, attended the SUSY 07 conference in Karlsruhe, Germany to make a presentation, "The Search for Higgs Bosons in H to WW Decays." The talk described new methods used by the CDF Collaboration to search for the Higgs boson at the Fermilab Tevatron Collider in Batavia, Illinois.

Sam Hewamanage, a graduate research assistant located at Fermilab, was accepted to attend the fourteenth CTEQ Summer School on QCD Analysis and Phenomenology in Madison, Wisconsin, from May 30 to June 7, 2007. This Summer School is a terrific opportunity for young physicists to learn about many aspects of Quantum Chromodynamics and its connection to experimental high energy physics.



SEPTEMBER 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			Colloquia Held Wed.'s 4 - 5 pm in BSB Rm. E.125			1
2	3 Labor Day	4	Colloquium 5 Dwight Russell	6 Retiree Coffee	7 Physics Picnic	8
9	10	11	Colloquium 12 A. Kim, UT Austin	13	University 14 Faculty Mtg.	15
16	17	18	Colloquium 19 Others TBA	20	21	22 Fall Premiere
23	A & S 24 Faculty Mtg.	25	Send Annual 26 Newsletter Items	27 Dept. Mtg.	TSAPS 28 Abstracts Due	29
30					TSAPS Regist. Due on Oct. 5	



OCTOBER 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	Summer '08 1 Sabbatical App. Due on this date	2	3	4 Retiree Coffee	5 TSAPS Reg. Parents	6 Weekend
7	8	9	10	11	12 Fall Break	13 Fall Break
14 Fall Break	15	16	17	18 TSAPS Meeting at Texas A&M	19 TSAPS Meeting at Texas A&M	20 TSAPS Meeting at Texas A&M
21	22	23	24	25 Dept. Mtg.	26	27
28	29	30	31 Send Items For Nov/Dec Newsletter !			