## CHAIRMAN'S WELCOME . . . *by Roger McNeil*

Welcome to our winter 2006 newsletter. While only a short time has past since our last newsletter (we are striving to put out two newsletters per year from now on), it has been an eventful period for our department, LSU and the State of Louisiana. We can sum up the Fall of 2005 with one word: "Hurricane". Two major hurricanes blew through the State in a single month. The names Katrina and Rita will not soon be forgotten. However, I am proud to report that LSU and the Department stepped up to serve many faculty and students displaced by the hurricanes. In particular,

- Approximately 3,500 students displaced from New Orleans colleges and universities were temporarily matriculated into LSU-Baton Rouge.
- In our department, 4 upper level physics majors took LSU Physics classes.
- Approximately 80 "Katrina Students" were enrolled in special introductory laboratory and lecture course sections.
- Three graduate students (from the University of New Orleans and Tulane) were temporarily employed as Teaching Assistants to help teach new laboratory course sections (Sten Thornburg, Athanasios Chalastaros, and Daniel Furst).
- UNO Professors Greg Seab and Carl Ventrice and Xavier Professors Murthi Akundi and Jessica Graber were employed as temporary instructors for lecture and lab sections for these "Katrina Students". These faculty were accommodated for a time in the houses of our department's faculty, as there was no available housing in Baton Rouge for most of the fall semester.

The cost of these extra sections and temporary instructors was absorbed by the department at the same time that higher education in the State was being dealt a budget "Rescission" and

the heavens, waiting to "hear" something that will set the scientific world on its ear — gravitational waves.

***- - LSU HIGHLIGHTS, SUMMER 2005***



Produced by violent events in

If a tree falls in the woods and no one hears it, does it make a sound?

Most people have heard this well-worn philosophical question, but there is a new variation that may not be as familiar: If black holes collide in deep space, can it be heard in the woods of Livingston Parish, LA?

As it turns out, scientists from LSU, the California Institute of Technology, In this unlikely location, researchers and technicians from a group called the LIGO Scientific Collaboration spend their days on the cutting edge of scientific discovery, monitoring parts of the universe that are unquestionably “off the beaten path.” Using lasers rather than telescopes, the staff of this unusual observatory “listens” to

*(Cont. from Page 2)*

that occur when gravitational waves pass through the planet.

**LSU and Gravitational Wave Study**

LSU has been a key player in the LIGO research project for some time, and much of the credit goes to Physics and Astronomy Professor Warren Johnson and Physics Professor Emeritus William Hamilton. These two LSU researchers have been leaders in gravitational-wave-detection research for decades. As part of its involvement in LIGO, LSU's Physics and Astronomy department began to build a strong group of faculty focused on the experimental and theoretical study of gravitational issues.

On the experimental study side, there is Giaime, an MIT graduate who helped design and install parts of the LIGO detector system. He was named "Chief Scientist" at the Livingston location in 2004. In addition, there is Gabriela Gonzalez, who previously worked on the LIGO project at MIT. She specializes in analyzing the data collected by the LIGO detectors and co-chairs one of the LIGO Collaboration's data-analysis working groups.

LSU's group of faculty focused on the theoretical study has grown in recent years. The group is led primarily by two physicists, Jorge Pullin and Luis Lehner, who work in the field of numerical relativity. Faculty and students in this arena work to solve some of the difficult equations posed by the theory of relativity, which provides the foundation of LIGO's research.

"LSU has pursued a harmonious approach to LIGO research, combining experiment and theory," said Pullin. "Apart from the experimentalists working at the LIGO site, LSU has created the largest numerical relativity group in the United States."

Other "stars" from the worlds of physics and astronomy have recently arrived at LSU, attracted in part by the proximity of the LIGO observatory. One such star is Edward Seidel, a physicist recognized worldwide for his work on numerical relativity, black holes, and high-performance computing. More recently, Manuel Tiglio also joined the LSU Physics and Astronomy faculty, as part of the numerical relativity group at the new Center for Computational Technology, which is led by Ed Seidel.

"There are an increasing number of LSU people involved in LIGO," said Giaime, adding that LSU students and post-doctoral researchers also work at LIGO Livingston.

**The Future**

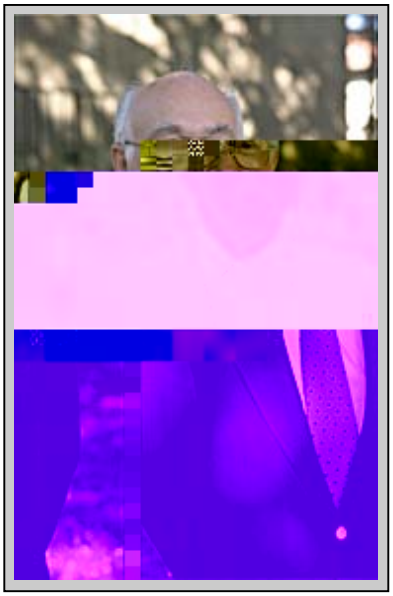
LIGO has had a series of scientific data-taking runs since 2002, and is now in the middle of its fifth such run (S5). Published results from the first several runs have not indicated any gravitational wave detections, but improved sensitivity obtained for S5 gives LIGO scientists cause for optimism. The current plan is to continue observations for more than a year, perhaps interrupted by short breaks for detector improvements.

"We don't get to choose when the sources for our data come to us, so we need to observe as much as we can," said Giaime.

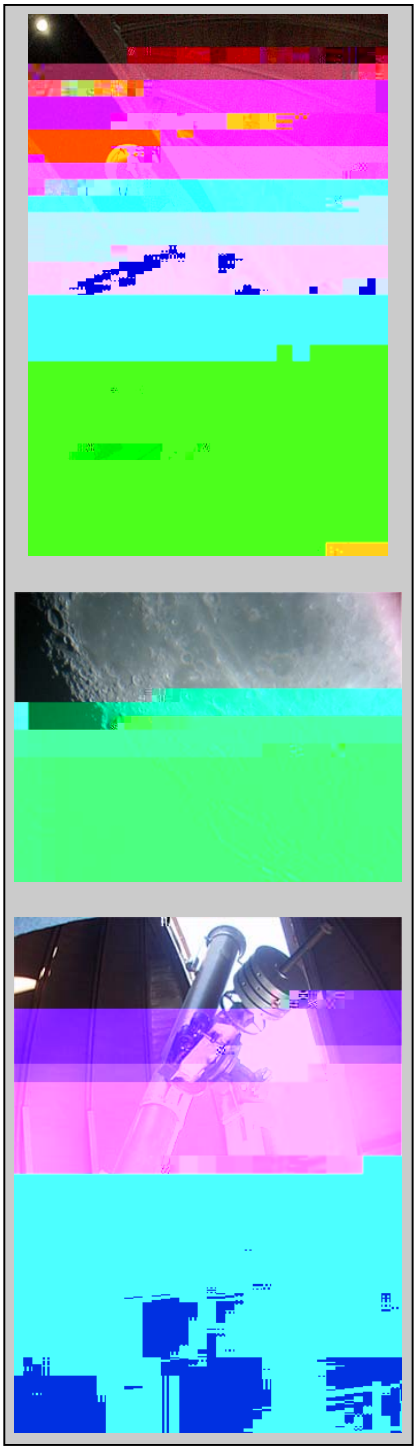
The goal of observing more will be met next fall, when LIGO will crank up its technology again and kick off a fifth observational run. This time, however, the goal is to observe for a six-month period. After that, Giaime said, there will be continuous observation for the next several years.

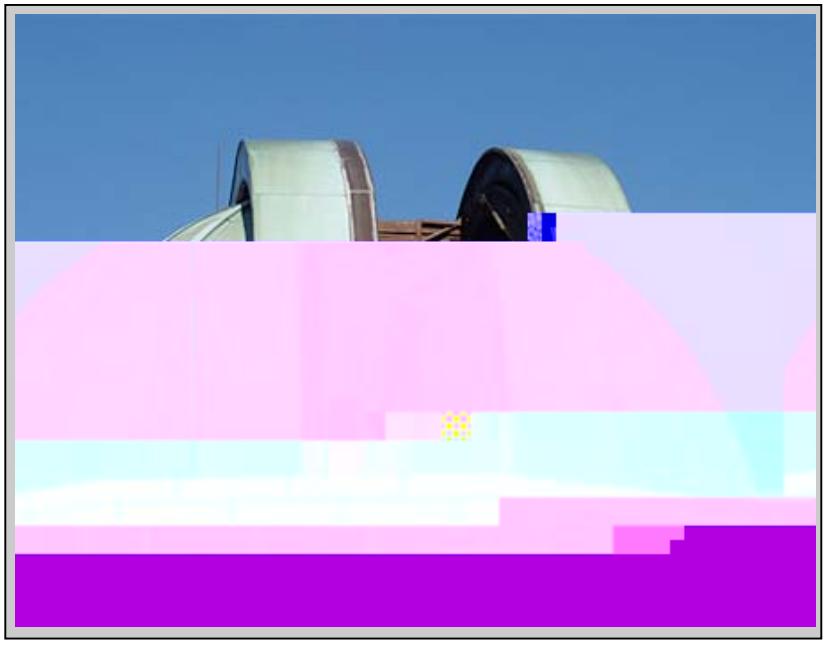
Ultimately, none of the scientists know if they will ever actually detect a gravitational wave, but it doesn't dampen their enthusiasm. The potential reward for their work is simply too great.

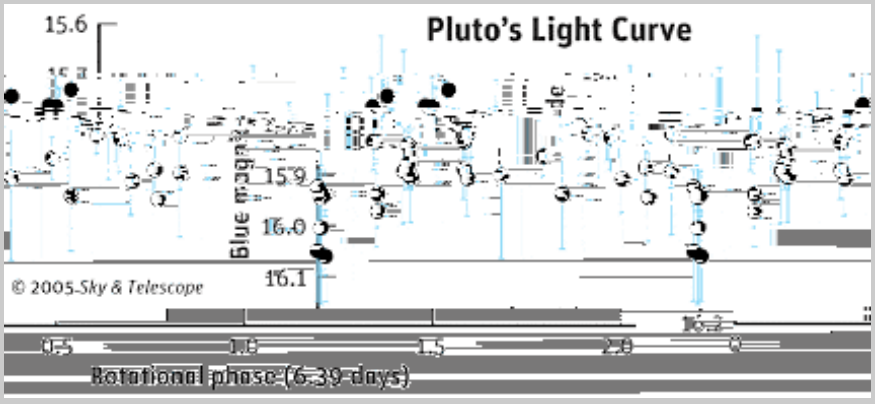
LSU's Warren Johnson may sum up the attitude of the researchers best.



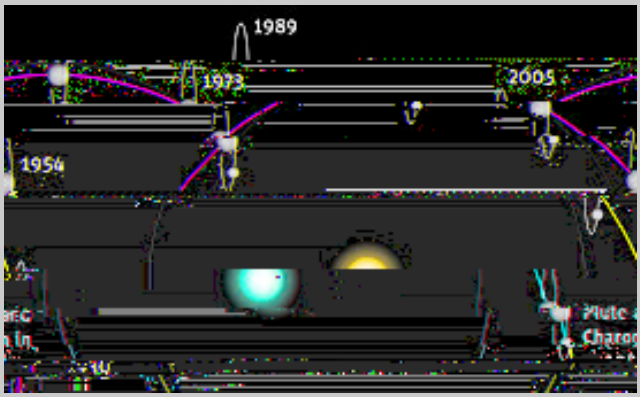
## Landolt Astronomical Observatory



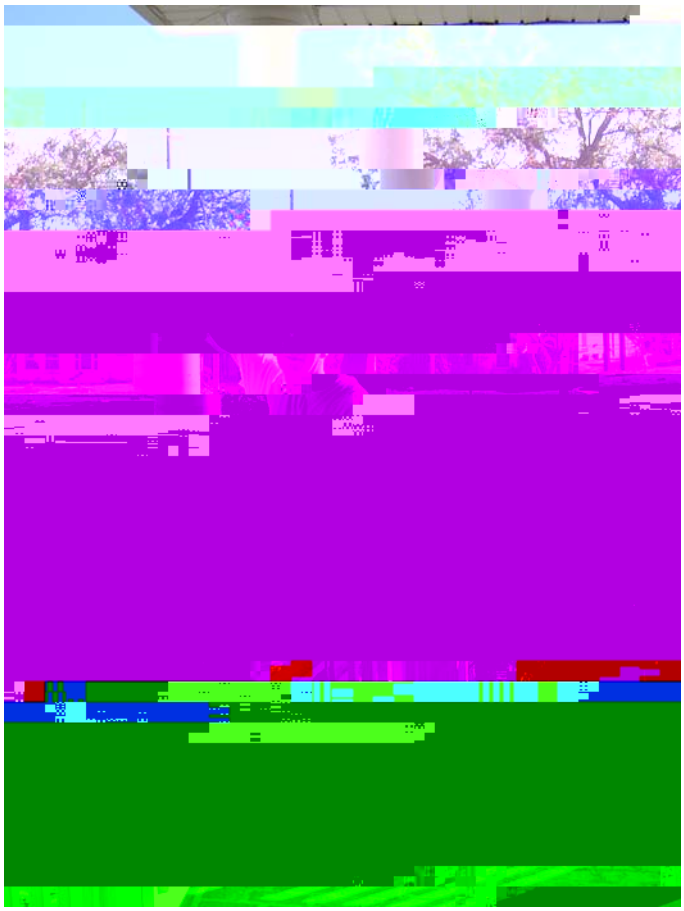





**This true-color map shows how Pluto's surface varies in reflectivity. Eliot Young and his colleagues created this map from data obtained at the McDonald Observatory in Texas during periods when Pluto was being partially eclipsed by its moon Charon. Because the two worlds are tidally locked, the map only shows Pluto's Charon-facing hemisphere.** ***Courtesy Eliot Young (SwRI) / Richard P. Binzel (MIT) / Keenan Crane / NASA.***




**As Pluto orbits the Sun, it shows different faces to Earth which partially accounts for its changing brightness. But Pluto's highly eccentric orbit also causes significant brightness changes. When Pluto comes close to the Sun, it sprouts an atmosphere. The gases freeze back on the surface of Pluto and its moon Charon when Pluto is far from the Sun. The relative sizes of Pluto's orbit around the Sun and the Pluto/Charon orbit are not to scale. Go to the URL above and click on the image to**



- **Arivand Chiruvelli - M.S., Particle Physics**
  *BS, Osmania University, India*

- **Ricky Hesston - M.S., Medical/Health Physics**
  *BS, Indiana University, Bloomington, IN*

***Please help us update our alumni database -***

We are very interested in how you are doing and where your career has ta en you. lease ta e a few minutes to respond with news about yourself to be included in our Alumni database.

The epartment of hysics and Astronomy maintains a database of all our alumni - h. ., .S., and B.S.

The following information is needed and can be submitted by e-mail to :

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- Current employment information, title, e-mail
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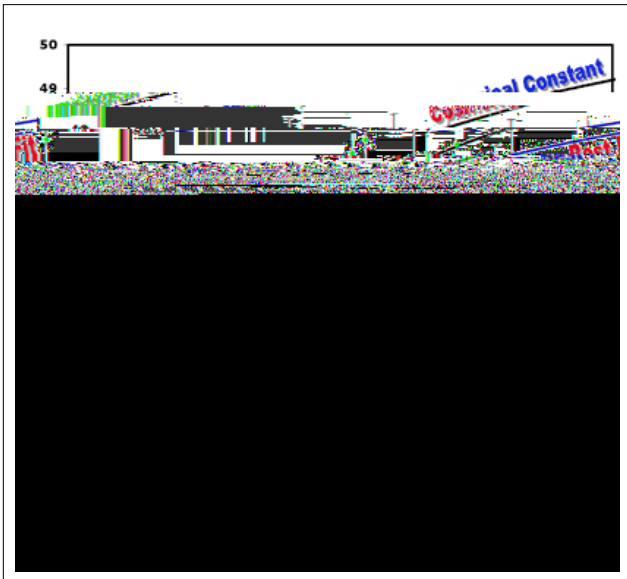


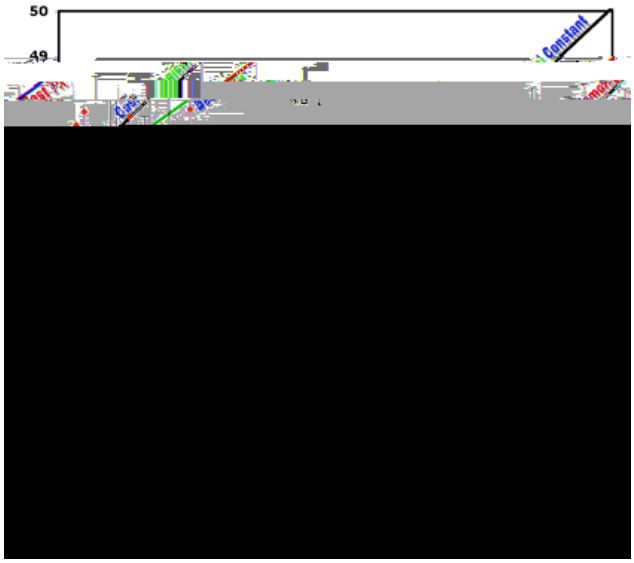


**GAMMA-RAY BURST HUBBLE DIAGRAM:**

## Gamma Ray Bursts and Implications for the not-so-constant Cosmological Constant

***Announcement at the 207th Meeting of the American Astronomical Society***

***(Cont. from Page 10)***

**The red star falls outside the blue and green regions, and the implication of this is that the Cosmological Constant appears to be rejected.**

**For more information on this research, please visit - *http://www.phys.lsu.edu/GRBHD/***

## Max Goodrich Distinguished Lecture Series

**Douglas D. Osheroff**
**Stanford University**

**1996 Nobel Laureate in Physics**

January 23, 2006 - presented the Max Goodrich Distinguished lecture, "How Advances in Science are Made"

January 24, 2006 - presented a special Departmental General Seminar, "The Effects of Impurities on the Superfluid 3He Phase Diagram"

View the abstract for this talk at

*http://www.phys.lsu.edu/dept/events/abosheroff2.html*

## CONGRATULATIONS GRADUATES !

***Summer 2005 -***

Bret Earl Hall (BS)
Suzannah Cathleen Lazar (BS)
Kenneth Bernstein (MS)
Laurie Anne Kelly (MS)

***Fall 2005 -***

John Barrett Deris (BS)
Christopher Jorgan Weaver (BS)
Mark Andrew Sauerwein (MS)
Nicholas Jabari Ouma Lee (Ph.D.)
Karly Mariah Pittman (Ph.D.)
Aniruddha Yadav (Ph.D.)
Weichang Zhao (Ph.D.)

**DONATION FORM**
***Thank you for your support!***

Private support has always been important in providing the margin of excellence for our students and faculty. In today's challenging economic times, LSU relies even more on our alumni and friends to make a vital investment in the future. Donations for the benefit of the Department of Physics and Astronomy will be used to enhance our teaching program and facilitate scientific discoveries that shape the future.

If you would like to make a tax-deductible gift for the benefit of the LSU Department of Physics and Astronomy, please complete