

CASPER NEWS

CENTER FOR ASTROPHYSICS, SPACE PHYSICS & ENGINEERING RESEARCH
ASTROPHYSICS & SPACE SCIENCE THEORY GROUP • HYPERVELOCITY IMPACTS & DUSTY PLASMAS LAB • SPACE SCIENCE LAB

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ASSTG

- Beowulf at Baylor?

HIDPL/SSL

- HIDPL Construction
- SSL moves to TSTC
- New Equipment

Personnel

- NSF REU Fellows
- Ke Qiao

Grants/Proposals

- Gear-Up, TexSpace,
- NSF, DOE
- ~\$10,000,000.00

ASSTG

Beowulf

Bruce Lindsay & John Vasut returned from the Goddard Space Flight Center's supercomputer school prepared (and eager!) to build a Beowulf system. Bruce and John's research proposals were selected as finalists in the spring semester allowing them to spend around a month (with all expenses paid under a NASA grant) at GSFC learning about the latest in supercomputer technology. One of the most promising recent advances in high speed computing involves building parallel processing machines using 'off the shelf' technology and the Linux operating system. The resulting parallel computer is known as a Beowulf system and was first developed at GSFC. The guys experienced first hand the power of such a system and have already begun modifications on their respective codes to take full advantage of it. They are also scheduled to give a seminar during the fall to pass on what they learned this summer. Now all we have to do is come up with the money to build it! (Anyone want to donate \$5K to the cause?)

Equipment

Equipment continues to roll into the Center due to John Simcik's remarkable scrounging talents. Recent donations include an HP9000 computer system, a VXI data acquisition system and a National Instruments signal conditioning system. This forms the foundation for the development of several full DAQ systems, which hopefully will be in place within the labs by the end of the spring semester.

HIDPL/SSL

HIDPL Construction

Construction on the HIDPL is progressing, albeit at a slower than expected pace. The inside of the building has been completely gutted by LET/SMT faculty & students and is awaiting renovation. The architect has finalized modification plans with the final phase of construction hopefully beginning during the fall semester. Current projections have us in the building sometime during the spring semester.

SSL

Due to the large amount of outside interest shown in the Center's activities, TSTC has graciously allowed us to occupy a second building on their campus for use as the Space Science Lab. The SSL was opened for business in May and already has three operating labs. Laser Lab 1 is being employed for the ruby system which is now up and running. Current plans are to install a Q switch on the system during the fall semester.

The Diagnostics Systems Lab is also open for business and is being used for development of a laser curtain diagnostic system. Once completed, this system will be used on the various accelerator systems for particle velocity measurements. The current design is in the middle of its third iteration and promises to be a stable and accurate method of tracking very small particles traveling at high speeds.

The Light Gas Accelerator Lab was moved from Baylor into the SSL at TSTC over the summer with plans for activating the single stage light gas accelerator this fall.

Personnel

NSF Summer Research Fellows

The 1999 NSF summer research program turned out to be a large success. Seven students from as far away as Japan and England were selected from over 100 applicants to participate in NSF funded graduate research at Baylor. All together, 21 graduate and undergraduate students worked within the Center this summer with between 20 and 30 showing up for the weekly NSF lunch bunch meetings. CASPER's NSF 1999 Undergraduate Research Fellows were Garrison Benton, Ted Cook, Mike Cook, Chad Howard and Kunio Sayanagi. Additionally, Jared Fowler worked in the SSL as an Undergraduate Summer Coop Fellow. Ryan Blackwell, Michael Frank, Erin Price and Brian Yarborough also worked in the SSL as part time undergraduate Coop Fellows. The Fellows presented their final research project reports on August 12th before an enthusiastic group of administrators, faculty and students. Congratulations to all!

Prelims

Ke Qiao took the Preliminary Exams in May for admission to the Ph.D. program in physics. He passed the majority of the exam and will finish up next May. He has already begun his research this summer which centers on electromagnetic wave interactions with dusty plasmas. Congratulations Mike!

Need More Information?

If you would like additional information on any of the above, contact Truell Hyde at Truell_Hyde@baylor.edu

Profile

Ray Nazzario • ASSTG

Ray Nazzario has been involved with CASPER's theory group since before there *was* a CASPER. Ray is completing his Ph.D. in physics and conducting theoretical research into protoplanetary formation. He is also employed full time at Baylor in the ITC. Although this insures that CASPER members can always get an answer to just about any question having to do with Baylor's computer system, it also means that Ray often has difficulty finding the time to work on his research. Ray is finishing up his Ph.D. proposal and plans to defend it during the fall semester. If you'd like to know what the latest theory is on how planetary systems form, feel free to ask Ray. He'd be glad to tell you!

CASPER Bytes

TexSpace & TSTC/Waco

A proposal to admit TSTC/Waco, as the first (and only!) two-year member of the Texas Space Grant Consortium will be discussed at TexSpace's fall meeting. We'll let you know what develops.

Surf CASPER . . .

The CASPER web page was recently updated with information about both the experimental and theoretical groups. It will also soon (I hope!) have information about CASPER's expanded educational outreach opportunities. Information about past flight projects as well as Center personnel is also on line. You can even download PDF versions of the CASPER news! The next time you're out surfing the web, drop on by and see what you think. One word of warning, CASPER's web page is designed to work with at least Netscape 4 or IE 5 or better. If you're running an older browser, I have no idea what you'll see!

www.baylor.edu/~CASPER

NASA Inspection

If you're interested in attending NASA inspection this fall, let the office know ASAP. We're trying to arrange a trip to the JSF HIL and need a head count to arrange for security clearances. Thanks!

Research

HIDPL/SSL

Research is finally underway within the experimental side of CASPER. This summer, CASPER research teams at the SSL assembled and fired a ruby laser which will eventually be used as a hypervelocity impact simulation system as well as the front end of a Laser Ablation Accelerator. A laser curtain diagnostic system was also engineered and constructed within the SSL with the final iteration designed to detect particles as small as a micron and moving at velocities up to 18 km/second. Research is currently underway to determine if such a system can be modified for use as a flight instrument.

Funded Grants/New Proposals

Gear Up Waco - FUNDED!

In August, Gear Up Waco was awarded funding by the Department of Education for a five-year period with the option for applying for an additional sixth year at the end of the funding period. Total funding for the grant is 12.165 million dollars over five years coming from the Department of Education along with in-kind funding from various agencies. Since CASPER is a partner (with Dr. Hyde as a Co-Investigator) in Gear Up Waco, the funding of this proposal means that almost a million dollars will come directly to the Center over the next five years. This will provide CASPER with a large outreach program as well as fund two full time staff positions, two graduate student positions, two technical student positions, as well as equipment and operating funds for the five-year period. Two of the major components of CASPER's portion of the grant will be to create and produce a Physics Circus and hold a Women in Physics information session for the Center. This should provide CASPER, LET and the Department of Physics with a powerful recruiting tool for attracting new majors. Additionally, the grant funds CASPER's participation in

NASA's Fly High program which provides opportunities for high school and undergraduate research teams to test their experiments under reduced gravity conditions using NASA's KC-135A. Congratulations to everyone involved.

Department of Energy

CASPER has been invited to present a proposal to the Department of Energy for the possible funding of several new lab facilities. If funded, the grant would allow for the fabrication and installation of a full dusty plasma system modeled after the Large Plasma Device at UCLA along with two new high-powered laser labs. All together, this would represent an investment of around 10 million dollars into the Center's labs. Recent funding of Gear Up Waco dramatically strengthens the DOE proposal in that it allows for the required educational outreach component of the grant to be funded by the Department of Education. Stay tuned for more details.

National Science Foundation

This year's NSF REU program took place between the first of June and the 13th of August. The 1999 undergraduate research program was the second in a three year funding cycle and culminated with the students presenting their research results as PowerPoint presentations in front of an audience comprised of faculty, students and administrators. They also were required to produce a research quality paper which will be considered for possible publication during the coming year. Several of the summer research fellows are planning on continuing their CASPER research next year either at Baylor or at their home institutions via the Internet. In addition to conducting research, the NSF Fellows were also involved in twice weekly group meetings with topics ranging from string and membrane theories to Beowulf computing systems and solid state physics. The group also went on a tour of the NASA SOFIA project, courtesy of Dr. Lorin Matthews a recent graduate of the theory group. All in all, a *great* summer!