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

CTH

The newest version of CTH is now up and running on a secure computer within the ASSTG. CTH is a family of codes constantly under refinement at Sandia National Laboratories for use in modeling complex multidimensional (one-, two-, and three-dimensional), multi-material problems which are characterized by large deformations and/or strong shocks. A two-step Eulerian solution algorithm is used to solve the mass, momentum, and energy conservation equations. CTH has been carefully designed to minimize the numerical dispersion present in many Eulerian codes. All quantities are fluxed through the computational mesh using second-order convection algorithms, and a high-resolution interface tracking algorithm is used to prevent unrealisitic breakup and distortion of material interfaces. CTH gives researchers within CASPER a powerful method for modeling hypervelocity impacts thus allowing for a better understanding of the experimental data collected in the labs.

CASPER in the Press

If you read the newspapers, you may have noticed that CASPER has been in the local and state press a lot during the past few months! Extensive articles on the establishment of the Center and the labs have been carried in both the Baylor Lariat and the Waco Tribune Herald. In addition, the Associated Press picked up the story and ran filler articles around the state. Several papers including the local Temple, Amarillo and Odessa newspapers ran either all or part of the AP story. The word is getting out!

HIDPL/SSL

HIDPL Construction

The TSTC Board of Regents approved the final cost (~$150,000) of the modifications on the HIDPL at their October meeting. The electrical engineer has signed off on the plans and construction is scheduled to begin early in 2000. Current projections still have us in the building during the spring semester.

SSL

If you've been to the SSL lately, you've probably noticed a few changes. The outside of the building has been completely painted and landscaping is scheduled for early this year. On the inside, the upstairs conference room now actually *has* a conference table and the machine shop is under construction.

Labs

The Q switch for the ruby system in Laser Lab 1 has been officially declared dead! As a result, we are currently debating what to try next. We'll keep you posted.

The laser curtain diagnostic system developed in the Diagnostics Systems Lab has finished final testing and is now being utilized on the Light Gas Accelerator. So far it is proving to be a stable and accurate method of tracking very small particles traveling at high speeds. CODEM sensor and amplifier circuits are also under development within the lab.

The Light Gas Accelerator Lab is now active with the Light Gas Gun undergoing initial calibration. A new remote firing mechanism and beam line are under construction. Final system calibration should begin during the spring semester.

Personnel

New Personnel within CASPER!

The first two positions provided by recent funding from the Department of Education have now been filled. Dr. Laura Bringol Barge and Mike Cook both started work (officially!) in October. Laura has been designated the Project Scientist while Mike is Project Lead Technician. Both have already proven to be invaluable additions to CASPER. We're glad you're here.

CASPER Undergraduate Research

Honors Thesis

Galen Swint will be finishing his Honors Thesis within CASPER during the spring semester. Galen's work on Chondrule Melting via Transient Heating Events has already led to several publications. He will be presenting a poster session at LPI this spring and defending his thesis toward the end of the semester. Good Luck!

Senior Research Projects

Ted Cook, Troy Henderson and Jason Saunders are all working hard on finishing their senior research projects. As the first undergraduates to work in CASPER's new experimental arm, they've learned volumes about parts acquisition delays, fabrication and calibration problems and a host of other real world problems. They will all be presenting their individual research results toward the end of the semester. Good Luck!

Need More Information?

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

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Profile

Larry White • HIDPL/SSL

Larry White (TSTC/Waco) is the HIDPL's vacuum/diagnostics guru. Larry has a world of experience for such a job gained from previous positions at Los Alamos National Laboratory and within the private sector. His areas of expertise include all forms of diagnostics, vacuum systems, and laser systems. While at the national labs, Larry was responsible for everything from the alignment of high-energy laser systems (laser fusion research) to target diagnostics. We're happy to have Larry as part of the team.

CASPER Bytes

Dr. Walter Gekelman

Dr. Walter Gekelman will be speaking on April 7, 2000 for our weekly seminar series. Dr. Gekelman is the Principal Investigator for the Large Plasma Device at UCLA, which is widely regarded as the premiere plasma Q machine in the world. He is coming to Baylor as part of the APS Distinguished Lecturer Series. Don't miss this opportunity to hear one of the top plasma physicists in the world.

Spring Conferences

CASPER personnel will be presenting papers at a number of conferences this spring. The Lunar & Planetary Conference will be held in March at Johnson Space Center while the 8th International Dusty Plasmas Conference will be held at Los Alamos in April. Currently, members of the Theory Group have submitted twelve papers to these two meetings. COSPAR (in Poland) is also coming up this summer and members of CASPER already have seven papers submitted for presentation and publication in Advances in Space Research. Congratulations for all your hard work.

Sandia National Laboratory

CASPER's entire (almost!) technical staff (Jerry Reay, Mike Cook, Larry White and John Simcik) made a trip to Sandia during the fall semester. They came back with lots of contacts as well as some other goodies to use in the labs. Hopefully, this is just the start of a profitable relationship! Thanks guys.

Research

HIDPL/SSL

The parts for the light gas accelerator beamline are finally here. (It only took three months to get them to Waco!) The beamline is under assembly and flanges are being welded on the target chamber to prepare it for installation. Hopefully, calibration data (as well as diagnostic tests) will be conducted during the spring semester. Additionally, the amplifier circuits for the various sensor arrays to be used in CODEM2 are under development. Integration with LabView should occur this spring under the watchful eye of Galen Swint. (Are you SURE you don't want to stay at Baylor for Graduate School?)

Funded Grants/New Proposals

Gear Up Waco – Physics Circus

CASPER's portion of GearUp Waco is progressing nicely. The Physics Circus has been scripted and the equipment is on order. The multimedia portion of the Circus is scheduled for filming in January with production coming soon after. Preliminary design work on the logos and banners is underway with actual production scheduled for March. Additional 'module' development should occur during the summer along with production of the related web page. Our first Circus is currently scheduled for early May. About 100 students will be participating in the Circus and its 'hands-on' related experiments, touring informational booths, competing in the egg drop contest and viewing one of several science films available. Hopefully, the publicity generated will provide CASPER, LET and the Department of Physics with a powerful recruiting tool for attracting new majors. Congratulations to everyone involved.

Department of Energy

During the fall of 1999, CASPER was invited to present a proposal to the Department of Energy for the possible funding of several new lab facilities. Two meetings were held with officials in Washington DC in November and December. Several exciting opportunities are developing from these contacts. We'll keep you posted.

National Science Foundation

CASPER was notified in December by the National Science Foundation that its 2000 NSF REU program had been funded for the third year of a three-year funding cycle. This brings the current grant award from the NSF to $104,596. In addition, a solicited supplementary proposal for $43,800 to the NSF was submitted in December as well. If funded, this would allow CASPER to bring in physics teachers from area high schools to participate in both the summer REU program as well as in Physics Circus In-Service Development. They would be paid two months of their annualized salary and be included in everything that goes on during the summer including field trips. Initial response to CASPER's preliminary announcement of opportunity has been very positive. The bottom line is that this not only offers an exciting summer opportunity for participating teachers, it also allows CASPER to recruit among the top physics students in the area!

School to Work Program

The Heart of Texas Council of Governments recently announced funding for a School-to-Work program at TSTC entitled "Science and Technology for Tomorrow" (SATT). The SATT program will bring AP science and math students from high schools in HOTCOG's service area to TSTC to explore careers in science and technology. Part of that experience will include meetings with the CASPER Director to discuss the BU-TSTC partnership, fellowship opportunities for select SATT participants in CASPER's summer program and careers in physics. Another outstanding recruitment opportunity!