BaBar's CsI Calorimeter is Installed

ON JULY 10 THE BaBar Collaboration celebrated the completion of a major construction milestone with the on-schedule installation in IR-2 of the barrel section of the CsI (Cesium Iodide) Calorimeter into the superconducting solenoid of the BaBar detector. This brings the B-Factory one big step closer to starting its physics program.

The CsI Calorimeter subsystem is the single most expensive component of the BaBar detector, costing $26M at completion. Of this, over $21M has come from US-DOE sources and the balance from collaborating institutions in Germany and the UK. Rafe H. Schindler, Co-Group Leader of the Research Division's Group E, has been the overall project manager for the system since November of 1995. Schindler recruited former SLAC engineer Knut Skarpaas out of retirement to be the chief design engineer for this complex system. Staff physicists Bill Wisniewski (Group E) and Helmut Marsiske (Group C) played major roles in the design and assembly of the calorimeter system.

23 TON ARRAY AT HEART

At the heart of the calorimeter is a 23 ton array composed of 5756 individual crystals. They are grown from high purity (99.999%) CsI salt and doped with thallium iodide, making them scintillate (emit light) when they are struck by particles coming from the electron-positron collisions in the PEP-II storage rings. Each foot-long crystal is shaped like a truncated pyramid – there are 48 distinct sizes – all fitting together to form a giant "fly’s eye" pointing near the center of the BaBar detector, where PEP-II’s beams will collide. The individual crystals are held in place by 280 egg-crate like structures ("modules") made of a thin carbon fiber and epoxy laminate.

PROTECTION OF SENSITIVE ELECTRONICS

There are seven distinct module shapes, with each module carrying 21 crystals. To detect the scintillation light, two large area photodiodes are attached at the rear face of each crystal and the output is fed directly into a preamplifier mounted just behind. Heat from these “buried” preamps is removed by cooling loops carrying a chilled fluorocarbon. The modules are mounted in seven rings to the inside of a large aluminum support cylinder which also houses the digitizing electronics in pockets of its water-cooled end flanges. The whole device is surrounded by a 3mm thick double Faraday cage to reduce radio-frequency noise pickup in the sensitive electronics. And, finally, to calibrate the system “on demand” with photons of 6 MeV, 20 mil thick aluminum tubes have been mounted to the inside cylindrical surface of the calorimeter to circulate a neutron-activated radioactive fluid, with a short (7 second) half life. A separate endcap closes the forward end of the barrel with one additional ring of 20 calorimeter modules (836 crystals). The endcap is now being assembled at SLAC by UK technicians and engineers from modules fabricated and loaded in the UK and airlifted to SLAC. It will be mated to the barrel in November.

For the past three years this project has occupied many of SLAC’s technical staff and much of the Research Yard–B403 housed an assembly line to fabricate the 280 modules, B224 housed the crystal testing and module loading lines, B109 the photodiode assembly and the zero-

(continued on Page 3)

See accompanying BaBar Article on Page 8
FermiLab Searches for New Director

"THIS IS A REAL committee, not a rubber stamp," says Charles Prescott, SLAC's representative on the FermiLab search committee. "Serving on a search committee can be pleasant when you know that your advice will be taken seriously." Prescott, along with 13 others, has been working for the past five months to create a short list of candidates for the job of director. John Peoples, the current director, announced his retirement effective July, 1999.

A search committee is the process that a university, business or laboratory uses when there is a vacancy in a high-level position. A representative sample of people is chosen for the committee, usually from the groups which are involved or interested in the outcome of the search. "Each lab is different," says Prescott, "so a SLAC search wouldn't be the same as a Fermi search."

In this case, the contractor for FermiLab is Universities Research Association (URA). Because Fermi was designed from the beginning as a user facility, the search committee was drawn from a wide number of universities with a large user base. Those involved on the committee are Cornell, MIT, University of Maryland, Johns Hopkins, Princeton, UCLA and Northwestern. In addition to the SLAC representative, there is a representative from LBNL and three from Fermi.

The search committee plans to finish its task at the end of August and forward to URA a short list of candidates for consideration. URA will then make an offer to a candidate and negotiations will take place.

Prescott describes the Fermi director's job as an important one for the field of high-energy physics in this country. "I'd say it's the senior position in HEP in the US," says Prescott, "so we need to do it right."

With such a large search committee and with so many references to check, it's inevitable that news about the candidates will emerge, but not from Prescott. He is tightlipped about sensitive details, but he did say that some women were among the candidates. "The rumor mill will have names pretty soon," says Prescott, especially in this month when URA starts acting on the short list of candidates.

What's the impact on SLAC? As HEP labs, Fermi and SLAC have much in common. The two directors, Burton Richter and John Peoples, have on numerous occasions been guests in Washington DC to educate our Congress about the need for funding for basic research. "Fermi has the potential to do great things in physics. A new director will need to set new directions for the lab." Prescott and all of SLAC will be interested in the results.

Richardson Named New Secretary of Energy

ON AUGUST 18th, BILL Richardson took the oath of office as the new Secretary of Energy, replacing Federico Peña. He will hold two Cabinet-level jobs for the time being. Richardson's position as Ambassador to the United Nations has been extended at the President's request. "Given recent developments affecting key US interests abroad, I am sure you can understand the importance of not leaving the UN post vacant at this crucial juncture," said Richardson.

Prior to his post at the UN, Richardson spent 14 years in Congress from the state of New Mexico, home of two Energy Department labs. Known for his diplomatic skills, he has been instrumental in hostage situations in Cuba, Iraq and North Korea. These efforts have led to two nominations for the Nobel Peace Prize. He has a BA degree from Tufts (1970), an MA (1971) from Fletcher School of Law and Diplomacy, and speaks fluent Spanish.

In his acceptance speech, Richardson thanked his "good friend and fellow New Mexican Senator Domenici for his strong support and wise counsel." Regarding his new role at Energy, he said, "I look forward to taking on the significant responsibilities and challenges of leading the Department—protecting our national security, advancing the frontiers of science and technology, helping to solve the challenge of global climate change, cleaning up waste sites throughout the country, working to bring down the cost of electricity to the American people, and ensuring a balanced energy portfolio for our nation. I want the Department of Energy to be one of the finest cabinet agencies. I want the American people to know the Department is working for them."

Richardson plans to spend as much time as possible in his new job, including traveling to DOE sites around the country.
BaBar Calorimeter (continued)

humidity storage room for the crystals, B110 the low humidity module storage area, and the main assembly and testing hall for the calorimeter. Endstation B was used to fabricate the large but fragile Faraday cage enclosing the completed barrel calorimeter. The final part of the system, the endcap, is being assembled in B113.

The greatest challenge of this project was to obtain the more than 6500 CsI crystals over a two and a half year period. Not only did they represent close to the world's annual production of CsI (used hitherto in oil-well logging, medical imaging and airport luggage scanners), but the BELLE detector at KEK was competing with BaBar to obtain an even larger quantity of crystals on precisely the same time scale. To meet the ambitious schedule and still control costs in the face of the large worldwide demand, a procurement strategy was developed by SLAC and the DOE. Immediately following the project's approval, SLAC contracted to buy 70 tons of the raw material calculated to be required to grow all the crystals. A small Midwest firm which had a new process for CsI purification was awarded the contract and they expanded production over the first year, delivering at their peak close to 5 tons/mo. While this strategy was understood to entail risk, it proved to be a very cost-effective end run around the world's established (and more expensive) CsI suppliers, who could then provide material for BELLE's crystals.

AMBITIOUS DELIVERY SCHEDULE

To grow the crystals in a short period of time and control technical and schedule risk requirements, contracts were negotiated with five distinct vendors worldwide – two in China, one each in the Ukraine, France and the UK. While the French and Ukrainians had existing production capability for large crystals, they still had to expand to meet our demands. The UK grower developed its technology by extending an existing process, and building many new furnaces. In China, the growth technology and hardware was developed through a joint collaboration on R&D with SLAC and BaBar. The individual contracts were re-adjusted and re-negotiated many times to maintain the ambitious delivery schedule required. Over the two years, almost 70 tons of salt has been shipped through SLAC back and forth worldwide to the crystal growers and then back to the US for re-purification. Last December deliveries to SLAC from the crystal growers peaked at almost 950 crystals per month.

INTERNATIONAL COOPERATION

The multi-national/multi-institutional nature of the CsI Calorimeter project is dramatic. Of the 5756 barrel crystals, 650 were supplied to the US by Germany while 456 of the 836 endcap crystals were provided to the UK by the US. The light readout packages for the system contain over 13000 photodiodes and were produced in Dresden. These were assembled to the crystals at SLAC and re-tested by teams of German technicians and physicists who also installed the light pulser fibers of the barrel. Module assembly tooling/components were designed and fabricated at SLAC, the U. of Mississippi and the U. of Notre Dame. Computerized test and QC equipment was designed and built at SLAC, the U. of Mississippi and the U. of Massachusetts. The initial design of the barrel support cylinder was done at LLNL; the final design and procurement was completed at SLAC. The endcap mechanics come largely from the UK. The U. of Iowa and Iowa State U. designed and fabricated the custom barrel mini-electronics crates and the extensive monitoring system, respectively. The 6500 preamplifiers were designed at SLAC and tested at UC Irvine. The on-detector digitizing electronics for the whole system comes from the UK. The circulating source calibration system for the barrel and endcap is a joint SLAC-Caltech-U. of Mississippi effort, while the light pulser monitoring system comes from Dresden and Bochum and UK institutions.

–Rafe H. Schindler
MOMENTS TO REMEMBER:

Part of Pief Panofsky's talk referred to the two-headed Drell, with the dual emphasis on theory and public service.

Condolezza Rice was the kick-off speaker for the Symposium, honoring Sid for his commitment to the values of the University.

Gloria Lubkin from Physics Today in conversation with SLAC's Martin Perl.

Matt Allen in conversation with DOE's Martha Krebs.

Liz Khuri chats with Clem Heusch.

Val Fitch from Princeton admired the Drell posters.

Greg Bologoff and Antonia Bolton in pre-symposium mode setting up the registration table.

Stan Brodsky, Theory, and Chris Llewellyn Smith, Director General of CERN.
THE DRELL FEST, JULY 31, 1998

David Price makes microphone adjustments between guest of honor Sidney Drell and dinner speaker James Bjorken.

(l-r) Michael Peskin, James Bjorken and Tatsu Takiuchi.

James Turner, Manager of the DOE Oakland Field Office presented Sid with a congratulatory letter and plaque for his service to the DOE.

Sid Drell and Pief Panofsky share a laugh at the symposium.

Willy Langeveld and Allyssa Prinz joined the party.

T.D. Lee in the foreground and Burton Richter.

David Leith, head of SLAC's Research Division.

A few of the party organizers pictured here (l to r): Carolyn Burton, Nina Stolar, Bonnie Rose and Nancy Hendry.

Elliott and Sue Bloom celebrating at the dinner.

Sid shares a joke with the violinist from the string quartet playing at the dinner.
Old Friends

BARBARA “BOBBI” KEMPTON WAS a special person. She had a talent for making people believe they were important to her. She constantly went out of her way, that “extra mile” for people. That was true right up to the end. Bobbi, who succumbed on July 29 from complications during surgery for lung cancer, had an indomitable spirit that was only offset by her sense of humor and realistic approach to life.

Bobbi first came to SLAC as an “on-call” employee in February of 1982. She worked first in the Plant Engineering Department (PED), then in the Research Yard, and finally accepted a position as Gary Warren’s office assistant in the Operational Health Physics Group (OHP), then known as the Environment and Safety Office (ESO). It was here at SLAC that she met her husband-to-be, John Kieffer. They seemed, almost from the beginning, to be the perfect match.

Bobbi and John got married just a day or two before John retired on May 31, 1991. They moved almost immediately to Heron, Montana.

In the weeks prior to her death, Bobbi valiantly tried to keep everyone’s spirits up. She worried about everyone worrying about her. She joked that she would be happy when she finished with the radiation and chemotherapy treatments—so that she could go shopping for “charming” hats.

Unfortunately, Bobbi was not able to keep her shopping date. She is survived by John, her two children, Kimberly Squire and Troy Kempton, her brother Dave Lawrence, and a whole lot of friends. Perhaps the best thing that can be said about Bobbi is this: she made a difference to a lot of us, and we will miss her.

-Friends of Bobbi Kempton

All's Fair that Ends Fair!

JUDGING BY THE NUMBER of participants and the long lines for the free massages and health screenings, the 1998 Health and Safety Fair was a huge success. The Fair, sponsored by the Operating Safety Committee (OSC), would not have been possible without the contributions of hard-working individuals from the OSC, the Safety, Health, and Assurance Department, the Palo Alto Fire Department, and the SLAC Medical Department.

The first Health and Safety Fair held in 1996 had 22 vendors participate. This year, the vendor participation increased by 70%. These are vendors who provide health and safety products and services to SLAC. To inform the SLAC community about the importance of health and safety, the vendors displayed ergonomic items ranging from chairs and keyboards to pens and wrist rests. The Fair had educational materials and many ways to interact with (15 Minute Massage) the vendors.

There was information on bicycle safety, life safety, and disaster preparedness. The guest speaker on the subject of Bicycle Safety was John Ciccarelli, the Bicycle Program Manager for Stanford University’s Department of Public Safety.

In keeping with the theme of the day, Guckenheimer Cafeteria Services (SLAC’s cafeteria management) provided healthy food and drinks. The vendors also provided raffle prizes which ranged from a telephone headset to an indoor grill to wrist rests. While there were employees who won prizes, the real winners were all those who attended the Fair. For a list of employees who won prizes as well as participating vendors, see the latest edition of the NOW News.
Eighth Beam Instrumentation Workshop a Success

Workshop. A banquet was held one night at the Golden Gate Yacht Club, where participants were treated to a rare glimpse of a sunset beyond the Bridge during a week of wind, rain, and even tornadoes, provided by the infamous El Nino.


The hard efforts of many people made the Beam Instrumentation Workshop a great success. Suzanne Barrett, the Workshop Secretary, together with Todd Slater, Michelle Steger, and Diana Viera worked tirelessly on logistical arrangements. Vern Smith located and procured the Workshop document bags. Nina Stolar made sure we had rooms and tours and audiovisual support. Heinz-Dieter Nuhn created and managed the BIW 98 Web site, and Clemens Wermelskirchen implemented the Web registration database. Raymond Muller from the Hamamatsu Corporation contributed to the banquet arrangements.

We’re very grateful to Kathryn Henniss, head of Technical Publications, and her staff: Jennifer Masek, Vibha Akkaraju, Bridgitt Ahern, Ruth McDunn and Terry Anderson. We wish to acknowledge the support of Associate Directors Keith Hodgson from SSRL and his predecessor, Art Bienenstock, and Ewan Paterson from the Technical Division.

We are grateful to Dave Sutter from the High Energy Physics Division of the Department of Energy for providing funding assistance, and to Burton Richter, Director of SLAC, for his overall support of the workshop at SLAC. The BIW 98 Organizing Committee is indebted to all these contributors for their efforts and for making the Workshop an enjoyable and rewarding experience.

–Robert Hettel and Stephen Smith

In-House Pagers to be Discontinued

THE OLD PAGING SYSTEM (dialing “11” for voice paging and “12” for digital paging) will be discontinued effective October 1, 1998. While only a handful of pagers on this SLAC-owned system are still being used, everyone should note this major change in the paging system. In addition to better area coverage and allowance for individually-tailored options for each user, the service vendor will provide fast replacement pagers as well as a central location for customer service.

Work Safe, Work Smart

An accident occurred on 8/10/98 that involved days away from work, as reported by Workmans’ Compensation Coordinator Sharon Haynes. The previous days-away-from-work claim occurred on 6/30/98. The number of calendar days between claims is 41 days. SLAC’s record number of days between claims remains at 150.

The Interaction Point © 1998, is published by Stanford Linear Accelerator Center. Editor-in-chief, P.A. Moore; Production Editor, Vickee Flynn. Deadline for articles is the first of every month. Items are published on a space-available basis and are subject to edit. Submissions may be sent electronically to tip@slac.stanford.edu or by SLAC ID mail to TIP, MS 20. Phone 926-4208.
BaBar Collaboration Meeting

THIS PAST JULY, THE BaBar Collaboration held its second Collaboration Week in 1998. More than 280 physicists and engineers from over 9 countries and 88 institutions of the Collaboration were here to prepare BaBar to enter its last phase before roll-on to the PEP-II beamline, expected to start early January 1999. After the completion of the mechanical installation of the IFR (the muon detector) and the installation and the successful commissioning of the superconducting solenoid built in Italy, the barrel calorimeter, made of about 6000 Cesium Iodide (CsI) crystals, was installed inside BaBar just before the Collaboration Week. (See Page 3 for picture.) In parallel, the Stand Off Box, housing the close to 11,000 photomultipliers of the DIRC detector, was shipped from France and mounted in IR6 where it was fully tested.

During the BaBar Collaboration Week we learned also the good news that the drift chamber, built at Triumf and received at SLAC early March 1998, was routinely taking cosmic ray data in the Light Assembly Building. With the completion of the construction of most of the hardware systems, BaBar is moving now to the checkout phase in IR2. This phase will be followed by a cosmic ray data-taking period, expected to start beginning of November. This commissioning phase will occupy the whole time until Christmas.

The preparation of these phases was the main focus of the July Collaboration Week, with a particular emphasis on the Online and Offline Software developments and the delicate transition from individual systems to a detector working as a whole. With the recent success of the PEP-II project in colliding its electron-positron beams, BaBar is on its way to be ready to take beam data on April 1st 1999.

—Gerard Bonneaud

New SLAC T-shirts Soon

IT'S SEPTEMBER, SO IT'S time to think about Fall clothes. SLAC will once again sell t-shirts, sweatshirts, caps and a variety of other merchandise. Order forms will be available later this month.

There will be new art work on this year’s t-shirts. In the past, the art work on SLAC merchandise has been the subject of intense and emotional debate. Some people prefer the old-style DOE seal which, in the absence of a logo, has served as a symbol of SLAC for many years. Some favor other types of graphics: for example, the colliding beam artwork that was used recently on the Web pages. Staff will have a chance to see this year’s t-shirt design in October.