

# THE PULSE

For the Personnel of the Laboratory for Nuclear Science

Volume 2 Number 2 \*\*\*\*\*June 1994

## MIT Corporation Executive Committee Meets at the Bates Center

On April 1, the Committee held its periodic breakfast business meeting at Bates. This was part of the policy of holding these meetings at various MIT venues to help familiarize the members with all aspects of the Institute.

An overview talk comprising the history and the present capabilities of the laboratory was given by the Director, Professor Stanley Kowalski. The members were then taken on a tour of the facilities conducted by the Bates staff.

The Executive Committee membership consisted of:

### MIT Members

*Paul Gray*, Chairman

*Charles Vest*, President

*Glenn Strehle*, Vice President and Treasurer

*Constantine Simonides*, Vice President and Secretary

*Mark Wrighton*, Provost

### Non-MIT Members

*Karen Arenson*, Deputy Business Editor of the New York Times

*Gerald Austen*, Surgeon-in-Chief, Massachusetts General Hospital

*Sam Bodman*, Chairman and Chief Executive Officer, Cabot Corporation

*Edward David*, Retired President of Exxon Research and Engineering Company

*Shirley Jackson*, Professor of Physics, Rutgers University and Consulting Research Physicist at AT&T Bell Laboratories

*Frank Press*, Senior Fellow of Carnegie Institution of Washington and President Emeritus of the National Academy of Science

*Morris Tannenbaum*, Retired Chairman of the Board of AT&T

## Bates Program Advisory Committee

The Bates PAC convened on May 18-21, 1994 to consider 14 new proposals and 16 updates of prior proposals. Each spokesperson was allotted 30 minutes to make their case and to answer questions.

The Committee then went into Executive Session to discuss the proposals and to formulate a set of recommendations for the consideration of the Director, Professor Stanley Kowalski. The proposals were of very high quality and some difficult choices had to be made especially in view of the fact that only about 2000 hours of beam time are projected for each of the next two years.

PAC members for this meeting were Peter Barnes, LAMPF (Chairman); J. Domingo, CEBAF; T.W. Donnelly, MIT; B. Holstein, U Mass; R. Holt, ANL; J. Koch, NIKHEF; R. Lourie, U Va; R. Milner, MIT; D. Skopik, Saskatchewan; and T. Walcher, Mainz.

A brief table of recommended hours and priority ratings has been made available and the detailed report should be ready by the end of June. Copies of the proposals are now available by contacting W. Lobar at Bates.

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## Promotions and Appointments at Bates

The following promotions and appointments have recently been made at Bates:

Brant Binns to Sponsored Research Technical Staff in the RF Group.

Tony Carter to Software Engineer in the Controls Group.

Joe D'Ambrosio has joined the Mechanical Group under the supervision of Jim Grenham. Joe is a licensed plumber and enters as a Technician A. (Mech.)

Joe Dzengeleski to Cryogenic Systems Engineer in the Research Support Group. Joe recently received a B.S.E.E. at Northeastern University.

Manouchehr Farkhondeh to Group Leader of Polarized Injector Group.

Gino Foti has been hired as an Accelerator Operator/Technician. Gino worked at Bates from 1983 to 1985 in the Co-op program of Northeastern University. Since receiving his B.S.E.E., Gina has been employed in the computer industry.

Alonzo Hawkins has been hired as an RF Design Engineer. Alonzo has been an RF consultant to such firms as ANL, Energy Kinetics and Martin-Marietta.

Ernie Ihloff to Associate Group Leader of the Mechanical Engineering Group.

Dan Prentiss to Technician A (E-M) in the Research Support Group.

Dan Tieger to Chief of Spectrometer Systems.

## Bates Users Group

The 1994 Annual Meeting of the Users group was held at Bates on May 18. The theme of the meeting was spin physics emphasizing the use of polarized electron beams in internal and external target experiments at Bates. The speakers and topics were:

S. Kowalski (MIT)	"Laboratory Review"
K. Jacobs (MIT)	"Status of the South Hall Ring"
J. Dubach (U Mass)	"Extracting Physics from a Program of (e,e')"
R. Alarcon (ASU)	Out-of-Plane Measurements Using Polarized Electrons"
R. Milner (MIT)	"Spin Structure of Polarized $^3\text{He}$ "
R. Holt (ANL)	"Status of T <sub>20</sub> at Novosibirsk and the Laser-driven Deuterium Target"

The evening business meeting was held at the Kernwood Restaurant in Lynnfield. Announced as the recipient of the Peter T. Demos Award was Joe Mandeville, whose Ph.D. was awarded by the University of Illinois, based on his experimental data taken at Bates. Joe is now at the Massachusetts General Hospital. The award is given to the student whose work is outstanding both in physics and in its contribution to the Bates Center. It is the annual graduate student achievement award in honor of Professor Peter T. Demos. It is in recognition of Peter Demos' many contributions to Bates, and in developing and directing the Laboratory.

The new officers for the coming year will be:

President:	R. Miskimen (U Mass)
Vice President:	W. Hersman (UNH)
Clerk-Treasurer:	H. Baghaei (U VA)
Director:	R. Lourie (U Va)

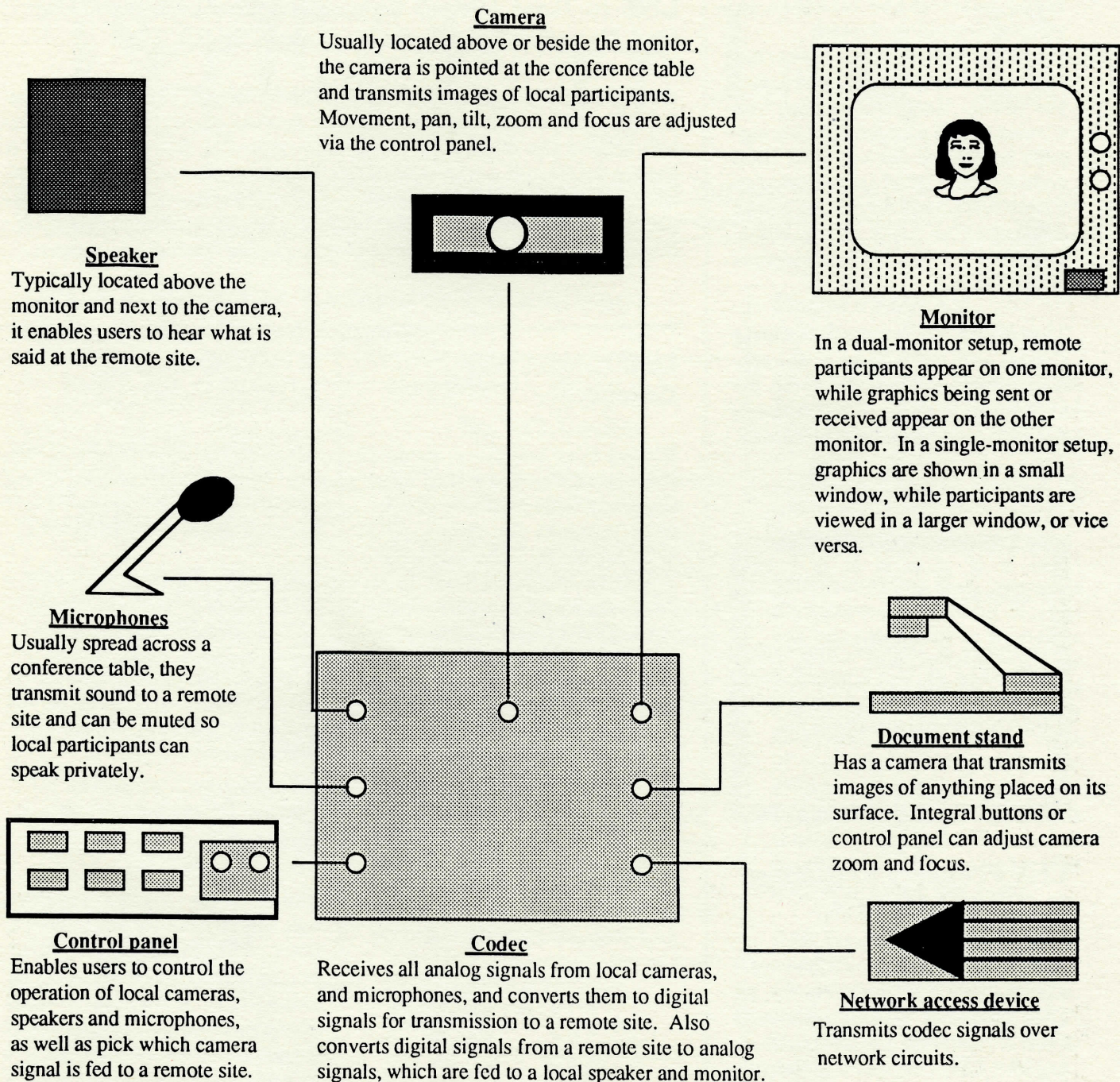
## The Massachusetts Volunteer Network

The Massachusetts Volunteer Network (MVN), on April 21, 1994, gave this new parent education program an Honorable Mention as Outstanding Service Program, saying: PARENTS FORUM demonstrates a positive approach to society's increasingly serious family life crisis. Recognizing the challenges of parenting in the nineties, the Cambridge-based volunteer group provides participants with the skills necessary to conquer these obstacles and to be a confident

and competent parent or spouse. Each family is different and each has specific issues it needs to face, that is why the heart of this training is the much overlooked ability to communicate, to listen, and to be sympathetic; in other words, taking the first step towards resolving these issues. PARENTS FORUM, though fairly new, is definitely an organization with a future. Why? Because above all else, it has realized that there is a need to preserve the community's most valuable asset--the keystone of any neighborhood--the family.

By: Eve Sullivan





## **Videoconferencing--Looking Good at the Computer Facility**

Eleanor Judd and Craig Ogilvie went to a meeting with their colleagues at Brookhaven National Laboratory and Lawrence Berkeley Laboratory. Instead of rushing to Logan to catch a plane they went to building 24 and sat in front of a camera which projected their images on to a monitor. At just after noon their colleagues from Brookhaven appeared on the adjoining screen,

and then their colleagues from the Lawrence Berkeley Laboratory. It is not exactly the quality of the 6 o'clock news, but like your TV set at home, there is a clicker!

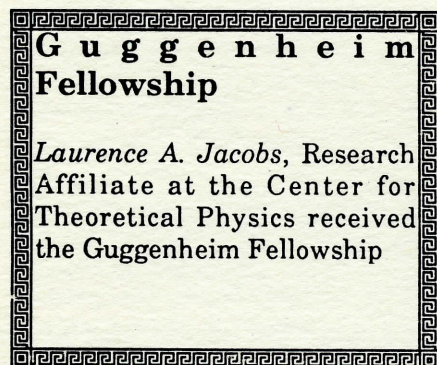
With videoconferencing one must be "socially correct," and not get involved in a spirited conversation, because the picture and the microphone work together. As

the camera moves from screen to screen the system is voice activated, so when an individual speaks the camera moves. If a person starts walking or moving around, the actual frame rate will decline significantly and the picture will become blurred. Video-conferencing is quickly becoming a technology that is being used in many universities and businesses worldwide. It will save hard-



dollars in travel and save time. A videoconferencing system includes monitors, cameras, microphones, speakers, and a control panel. Components plug into a codec which converts analog signals to digital format and then passes that digital information to a network access device for transmission. The heart of the videoconferencing system architecture is the codec.

The LNS Videoconferencing Center will be run on a charge-back basis. Arrangements for videoconferencing can be made through Jean Flanagan at 8-5447.



## LNS Property to Change Hands July 1, 1994

The MIT Property Office will assume sole responsibility for all LNS property management and control functions for LNS, including the Bates Linear Accelerator Center and all off campus locations. This will include compliance with MIT and the U.S. Department of Energy regulations which require tagging equipment, periodic physical inventories, and reports. During the next few months, many of you will meet the individuals assigned to the responsibility for property control within LNS. Dick Adams will serve as the liaison between LNS and MIT Property.

## LNS to Host Chiral Dynamics Workshop: Theory and Experiment Workshop, July 25-29, 1994

Aron Bernstein and Barry Holstein of (U. Mass, Amherst) will co-host the Chiral Dynamics Workshop. Approximately 75 participants will attend the Workshop. The motivation for the workshop is to gather interested experimentalists and theorists to discuss experiments, to make the most sensitive tests of the present theories, the phenomenology of these experiments, and the current state of the theoretical predictions. *Joanne Gregory* is the Workshop Secretary.

## LNS United Way Campaign

United Way solicitors, Jeanne Hillery, Betty Sapp and Earl Haywood wish to thank you for your support for this year's MIT campaign. The Lab's participation increased from 19 to 30 donors and our gifts went from \$3,922 to \$4,500. One member of the Laboratory contributed over \$1,000 and joined the 60 MIT Leadership Givers.

MIT, as a whole, raised over \$320,000. This will strengthen the Massachusetts Bay United Way Program. The United Way Program helped 1.7 million men, women, youth and children and over 200 health and human care agencies in our area last year.



Thank You!

## MIT Community Service Fund (CSF)

Joy Gurrie and Earl Haywood, solicitors for MIT Community Service Fund this year, wish to thank those who contributed.

Eight LNS /Bates donors gave a total of \$275. (Last year 3 donors gave \$247.)

It is not too late to give. Your gift or pledge may be sent to Joy or Earl or you may forward it to CSF, Room 5-208.

## Bates Telephone System Upgraded

The telephone system at Bates was upgraded on Friday, March 25th. The change made Bates an integral part of the MIT telephone network. This change allows you to dial Bates extensions directly from campus or outside. The main facility number is (617) 253-9200.

THE PULSE is a publication of the Laboratory for Nuclear Science for the LNS Community.

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If you have any ideas and/or suggestions for new features in THE PULSE, please send them in to Jean Flanagan, 26-540.



# The MIT Tech Talk

April 27, 1994 Volume 37 Number 30

## MITers Help Discover Evidence for Top Quark

by: *Elizabeth A. Thompson*

Eighteen MIT scientists are part of the team that announced yesterday the first direct evidence for the top quark, the last of the subatomic particles believed to be the building blocks of matter.

The international team of 440 scientists is based at the Fermi National Accelerator Laboratory, home of the Tevatron accelerator where the work was conducted. The MIT group, which is composed of scientists from the Department of Physics and the Laboratory for Nuclear Science, is led by Assistant Professor Paraskevas Sphicas of physics. Professor Sphicas played a major role in developing one of the analysis approaches that form the basis for the new evidence.

This evidence "is very significant," said Lawrence Rosenson, a professor of physics and a member of the MIT group. That's because "the current model of particle physics, the so-called Standard Model, which is our best view right now of how the universe works, depends crucially on the discovery of this last quark," he said.

"Until now only five quarks had been identified," Professor Rosenson continued, but the Standard Model predicted a sixth. "So essentially since 1977 (when the fifth quark, the bottom quark, was discovered), we've been looking for this object. It has turned out to be very difficult to find."

Professor Rosenson noted that at this point the Fermi team "is still steering clear of calling this the firm discovery of the top quark; rather, we believe that we have strong, though statistically limited, evidence for its existence.

More data will be obtained within the next year or so, which we hope will confirm the existence of this quark."

In discussing MIT contributions to the work, Professor Rosenson said that Professor Sphicas "played a pioneering role in developing one of the analysis approaches that form the basis for this current new evidence."

Members of the MIT team in addition to Professors Sphicas and Rosenson are: Institute Professor and Nobel laureate Jerome Friedman, Research Scientist Gerry Bauer, Postdoc José Benlloch, Postdoc Robert Mattingly, Principal Research Scientist Konstanty Sumorok, Research Scientist Stephen Tether, and Steven Pavlon, Sponsored Research Technical Staff. All are in the Laboratory for Nuclear Science; the faculty members are also in the Department of Physics.

The following physics graduate students are also on the team. At MIT are Paul Ngan, Vincenzo Lia, Dejan Vucinic, and Tushar Shah; at Fermilab are Wasiq Bokhari, Troy Daniels, Ken Kelley and Petar Maksimovic. In addition, team member Baber Farhat received the PhD in physics from MIT this January.

The 440-member Fermilab team that made the announcement, formally known as the Collider Detector at Fermilab collaboration (or CDF), submitted a research paper on their findings last Friday to the journal *The Physical Review*. Fermilab is a Department of Energy National Laboratory.



## MIT Scientists Have Played Major Roles in Other Quark Discoveries

by: *Elizabeth A. Thompson*

With the apparent discovery of the top quark, the last of the subatomic particles believed to be the building blocks of matter, MIT scientists have now been involved in tracking down four of the six quarks predicted by leading scientific theory.

Last Tuesday an international team of physicists, including 18 from MIT, announced the first direct evidence for the top quark. Physicists had already identified the so-called up, down, charm, strange, and bottom quarks, but the Standard Model of particle physics, scientists' leading theory for the nature of matter, predicted a sixth--the top quark.

At a seminar here on the day of the announcement, Assistant Professor Paraskevas Sphicas of physics, who led the MIT group, emphasized that "the [new] data provide evidence for, but don't firmly establish the existence of, the top [quark]. In order to confirm it we need more data." (Further experiments over the coming year at DOE's Fermi National Accelerator Laboratory, where the work was conducted, are expected to provide that data.)

Nevertheless, Professor Sphicas said, "the Standard Model seems to be surviving another test."

Professor Robert J. Birgeneau, dean of the School of Science, noted in an introduction to the seminar that of the six quarks predicted by the Standard Model, "four are known because of MIT direct discoveries or MIT collaborations."

In the late 1960s J.A. Stratton Professor of Physics Henry W. Kendall, Institute Professor Jerome I. Friedman, and Professor Richard Taylor of the Stanford Linear Accelerator Center (SLAC) set the stage for the quark hunt by discovering the first quarks--the up and down. They shared the 1990 Nobel prize for physics for that work.

Then in independent experiments Samuel C.C. Ting, the Thomas Dudley Cabot Professor of Physics, and Professor Burton Richter (MITSB'52 and PhD in physics) of SLAC uncovered the first evidence--through the "J/psi" particle--of the charm quark. The two shared the Nobel prize for physics in 1976 for that achievement.

"And fortunately today we're able to make an announcement of the apparent discovery of the top quark," Dean Birgeneau said. The MIT group that contributed to the new evidence includes three faculty members: Institute Professor Jerome Friedman (who has done it again, said Dean Birgeneau), Professor Sphicas, and Professor Lawrence Rosenson of physics. The three hold appointments in the Laboratory for Nuclear Science (LNS) and the Department of Physics.

Six LNS staff members and nine physics graduate students were also involved in the work.