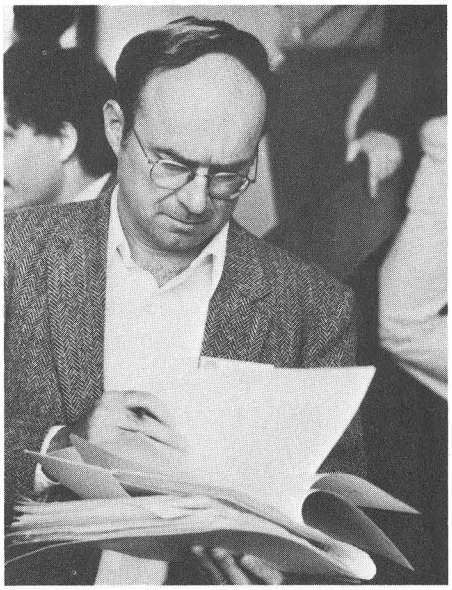
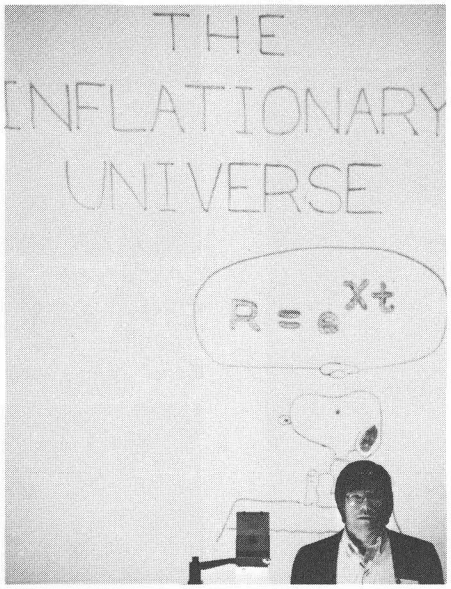
May 31, 1984
FERMI NATIONAL ACCELERATOR LABORATORY

FermiNews

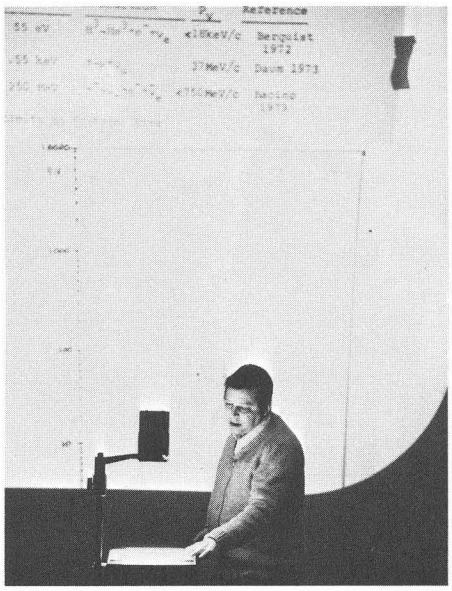
ASTROPHYSICISTS HOST SPACEY CONFERENCE



Jim "Maxwell" Bardeen, brother of theorist "Buffalo" Bill Bardeen, looks for dark matter in his conference packet.



Snoopy, with the help of Alan Guth, particle theorist/cosmologist from MIT, ponders the Inflationary Universe.



Particle Experimentalist, Frank Sciulli, from Columbia University, gave a review on Neutrino Mass/ Oscillation Experiments.

by Rocky Kolb and Michael Turner

During the first week of May, the theoretical astrophysics group at Fermilab hosted an international conference on science at the interface of particle physics and cosmology/astrophysics. The conference "Inner Space/Outer Space" was attended by a very diverse group of more than 200 physical scientists, including astronomers, astrophysicists, cosmologists, low-temperature physicists, and elementary particle theorists and experimentalists. The common interest which brings this diverse group together is the connection between physics on the smallest scale probed by man--the realm of elementary particle physics--and physics on the largest scale imaginable (the entire Universe)--the realm of cosmology.

In its infancy the Universe was a hot soup of quarks and leptons, closely resembling the conditions created in very high energy particle collisions.

One of the intriguing connections between particle physics and cosmology is the possibility that most of the mass in the Universe resides in a yet-to-be-detected sea of elementary particles which are relics of the earliest moments of the Universe. Marc Davis (UC Berkeley) gave an observer's view of the large scale structure in the Universe, and Jay Gallagher (Kitt Peak National Observatory) presented the evidence that there are more to galaxies than meet the eye--that is, that most of the mass in a galaxy is not in the form of stars. If the mass is not in the form of stars, it probably exists in a dark spherical halo, which is possibly comprised of the exotic relics mentioned above. Simon White (Arizona) summarized the results of numerical simulations of the formation of structure (i.e., galaxies, clusters, etc.) in model Universes with different types of elementary particles as the 'dark matter.' Based upon comparison of the simulations and the observations which were discussed by Davis, the preliminary conclusion is that the dark matter is probably not massive neutrinos, but might be more exotic particles such as axions or one of the particles from the

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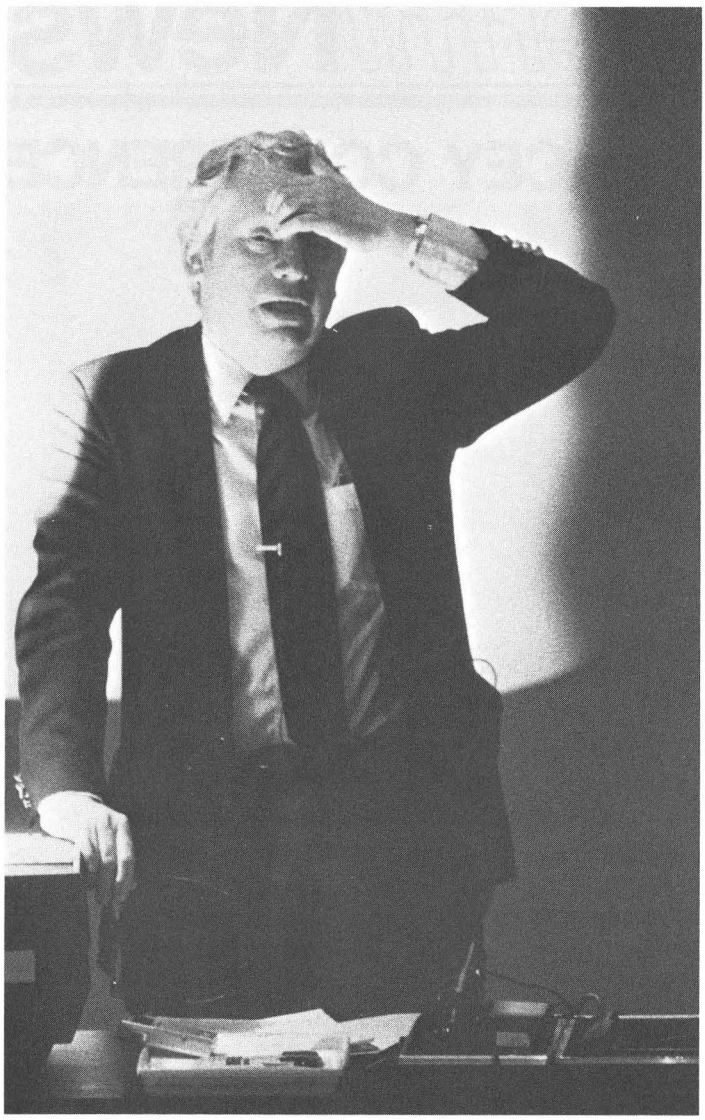

Nobel Laureate Steven Weinberg from the University of Texas spoke about extra dimensions, and claimed the compact dimensions are bigger in Texas.

Conference workers (left to right) Marilyn Paul, Teri Martin, Michelle Gleason, Pat Oleck, and Sue Winchester do their Rocky Kolb impression for attendees.

From east, west, north, and south they came: (left to right in foreground) Larry Abbott, Brandeis University, Steve Ellis, University of Washington, and Pierre Sikivie, University of Florida.

supersymmetric zoo. On the final day of the conference, J.D. Bjorken (Fermilab) discussed the prospects for actually producing, at present or future accelerators, some of the more exotic (i.e., not yet known to exist) particles which have been suggested as candidates for the dark matter.

In the 15th century, Copernicus suggested that the earth is not at the center of the solar system. Bruno in the 16th century took the Copernican idea one step further when he wrote that there are "...innumerable suns, and an infinite number of earths revolve around those suns..." In the 20th century, we discovered that our solar system is not at the center of our own galaxy, and that our galaxy is but one of billions of galaxies in the Universe. At the Fermilab conference we heard about equally heretical theories in which the Universe we observed might well be only one among many, that there may be more than three spatial dimensions, and that the matter of which we are made (neutrons, protons, electrons) may not be the dominant form of matter in the Universe. It is just possible that one of these ultimate extensions of the Copernican principle will be confirmed by high-energy experiments at Fermilab or elsewhere. We all hope that the physicists and astronomers working in this field fare better than did Bruno (who was burned at the stake, February 17, 1600).

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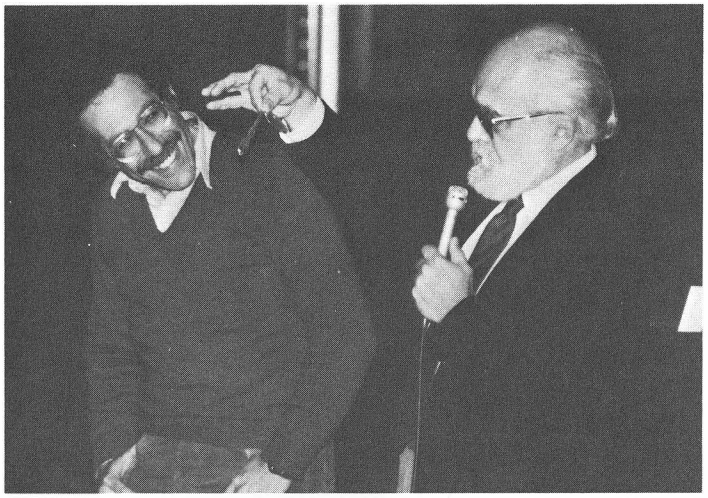

Nicola Vittorio (left), University of Roma/UC Berkeley, is amazed as James "The Amazing" Randi bends his dessert spoon during the banquet in Hutchinson Commons at The University of Chicago (Fermilab was charged extra for bent spoons).

In addition to the hectic scientific program (up to 12 hours of sessions a day!), the participants were treated to a cookout where they were able to try Fermilab's famous buffalo stew, and a banquet and cocktail party at The University of Chicago. The entertainment at the banquet included James, "The Amazing" Randi, a professional magician, Leon "The Laugh" Lederman, an amateur comedian, and the Cheech and Chong of Astrophysics (Rocky Kolb and Michael Turner).

The organizing committee for the Inner Space/Outer Space Conference included Rocky Kolb, David Lindley, Keith Olive, Chris Quigg, David Schramm, David Seckel, and Michael Turner.

The real work of organizing and running the conference was done by Marilyn Paul and Anne Burwell along with their very able staff of assistants Michelle Gleason, Teri Martin, Pat Oleck, Raeburn Wheeler, Sue Winchester, and Samuela Yarbrough.

Copies of transparencies from the talks are available for viewing in the library; designer t-shirts are available for $5 in the Astrophysics Department, WH3W.

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JAZZ SHOWCASE JUNE 23

by Jane Green

Two of Chicago's top-flight pianists will bring the good-time sounds of ragtime and boogie-woogie, as well as expressive blues, to Fermilab for our annual Jazz Showcase. Chicago-style jazzman Art Hodes and legendary bluesman Blind John Davis will be featured at 8 p.m. on Saturday, June 23, in Ramsey Auditorium for this year's showcase.

Art Hodes is a "living summation of a great jazz piano tradition." Performing with his sextet, the Art Hodes All Stars, this shining pianist performs melancholy blues as well as "scampering rhythm tunes" and ragtime. His music reveals the inspiration he drew from Jelly Roll Morton and James P. Johnson. Critics delight in the improvisational Chicago-style jazz of Hodes, proclaiming that his jazz, slow or fast, conveys "qualities you feel as much as hear--joy, wit, taste, freshness, and serenity."

Blind John Davis

Since the blues-rich Chicago music scene of the 1930's and 40's, Blind John Davis has been one of our city's fabled blues pianists. His sextet, Big Johnny Davis and His Original Music Masters, celebrates both the barrelhouse and boogie blues styles with enthusiasm and energy. Since the 1970's when a demand for his style revitalized, Blind John Davis has toured Europe and performed at the prestigious Mariposa Folk Festival in Canada.

Admission to this jazz and blues extravaganza is $6, and tickets are available at the Information Desk in the atrium of Wilson Hall, ext. 3353. Phone reservations are held for five days.

GENERATIONS PASS WHILE SOME TREES STAND

On Arbor Day, May 16, the weather cooperated and 250 volunteers planted 95 trees around the Users Center area. Trees planted included dawn redwood, red and sugar maples, lindens, dwarf apple and pear, and river birch. All of the trees came from the Fermilab nursery. Thank you to all who helped make this year's Arbor Day a success!

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