



Fermilab: A Collaborative History

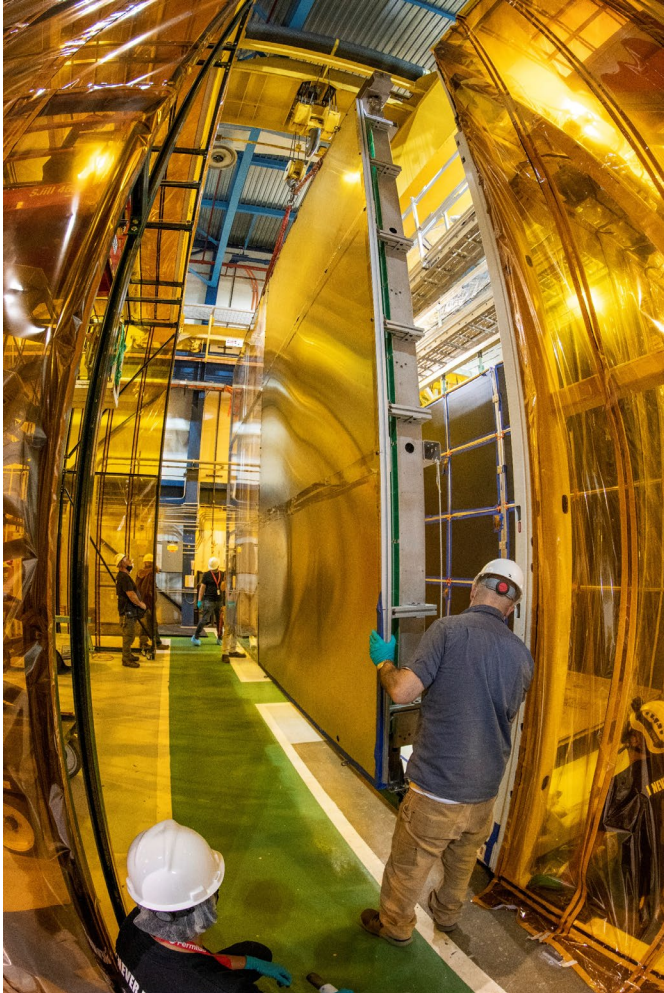
Valerie Higgins, Fermilab Archivist and Historian

56th Annual Fermilab Users Meeting, June 28, 2023

From Then...



...to Now

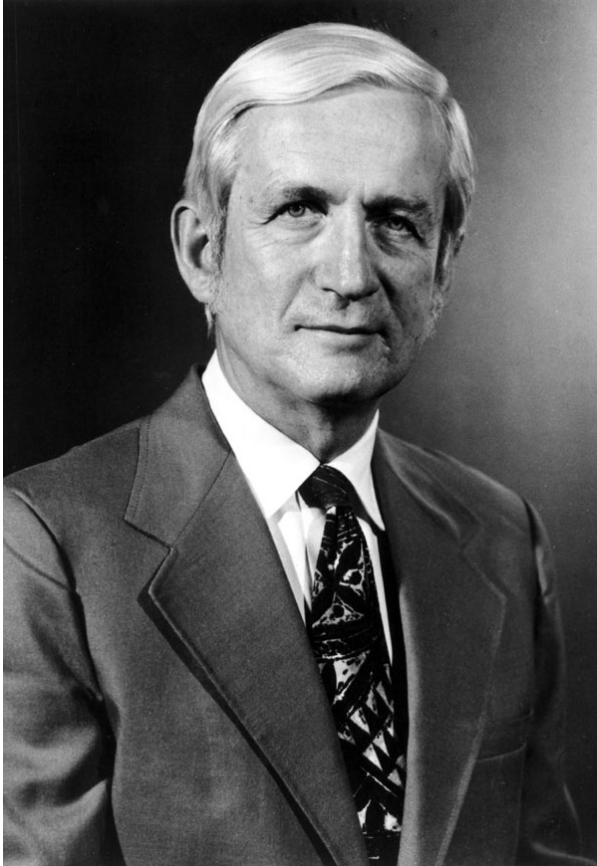


Fermilab Prehistory

- April 1963: Ramsey Panel
- June 1963: Leon Lederman's "truly national laboratory"
- June 1965: Berkeley design study
- November 1965: URA organized to manage lab
- December 7, 1966: AEC selects Weston, Illinois as the site for the new accelerator

Fermilab Prehistory

Ramsey Panel (December 1962 - April 1963)

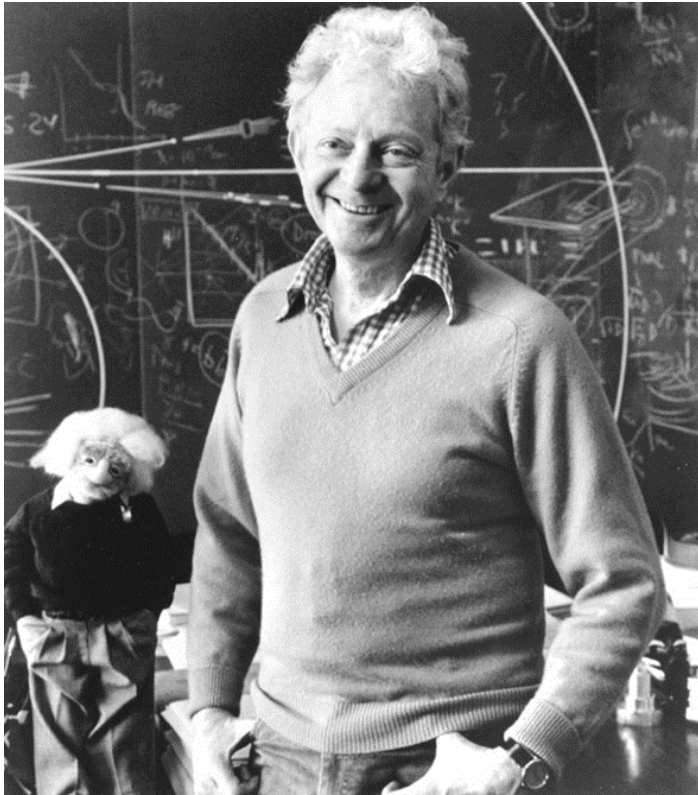


Norman F. Ramsey

“...Authorize, at the earliest possible date, the construction by the Lawrence Radiation Laboratory, of a high energy proton accelerator at approximately 200 BeV energy.”

Fermilab Prehistory

“Truly National Laboratory” (June 1963)

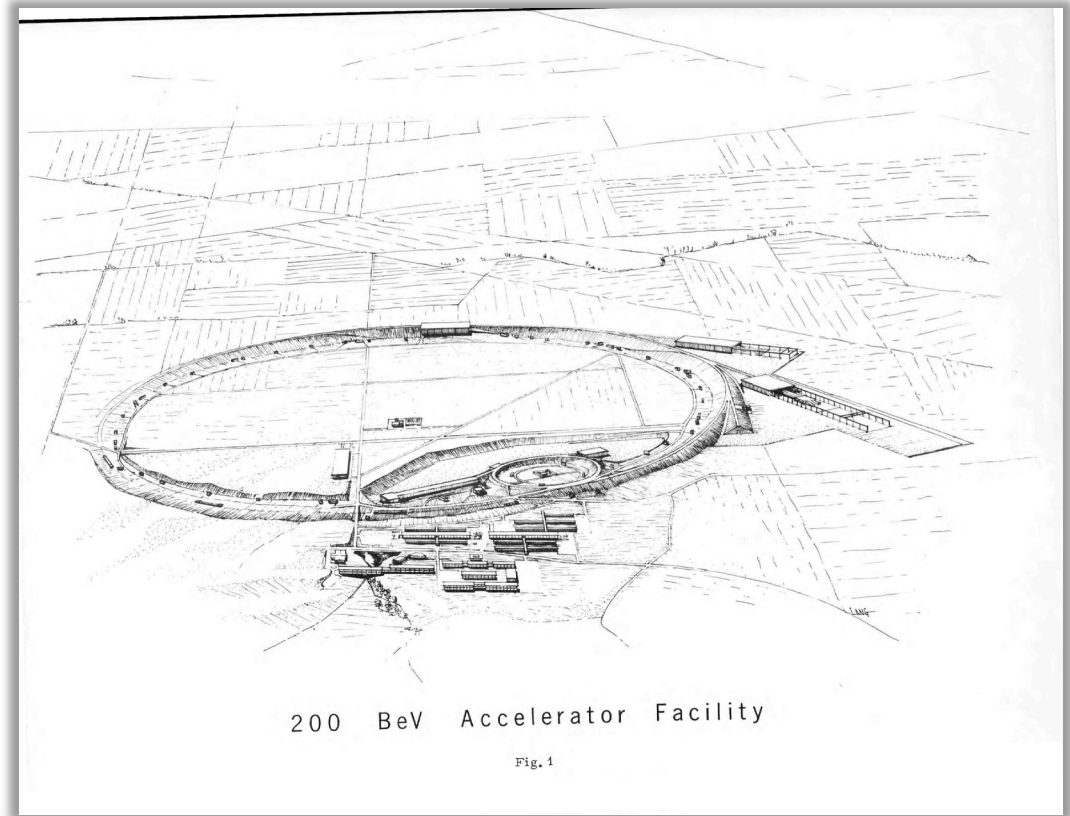
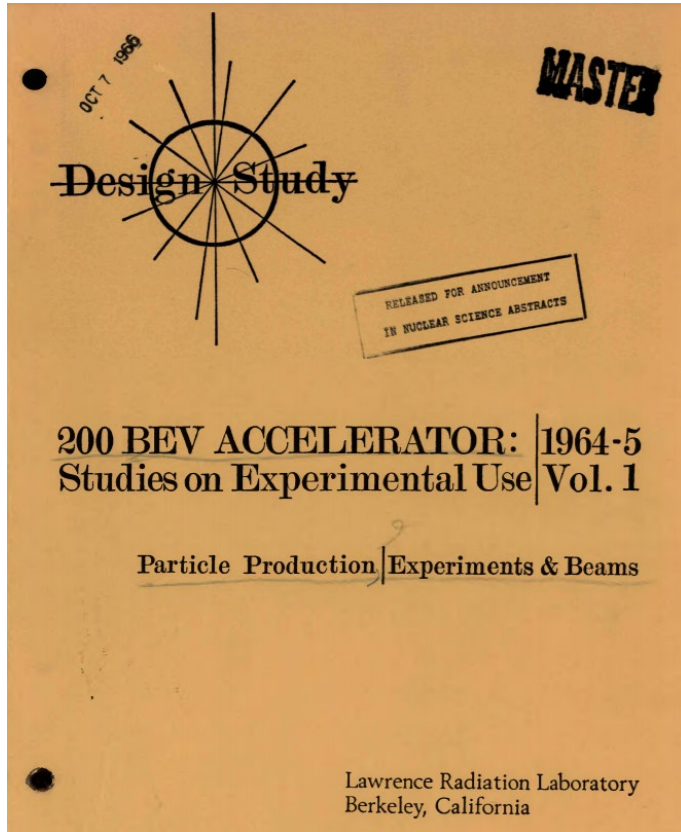


“...the new facilities are accessible as a right to any physicist bearing a competitively acceptable proposal.”

Leon M. Lederman

Fermilab Prehistory

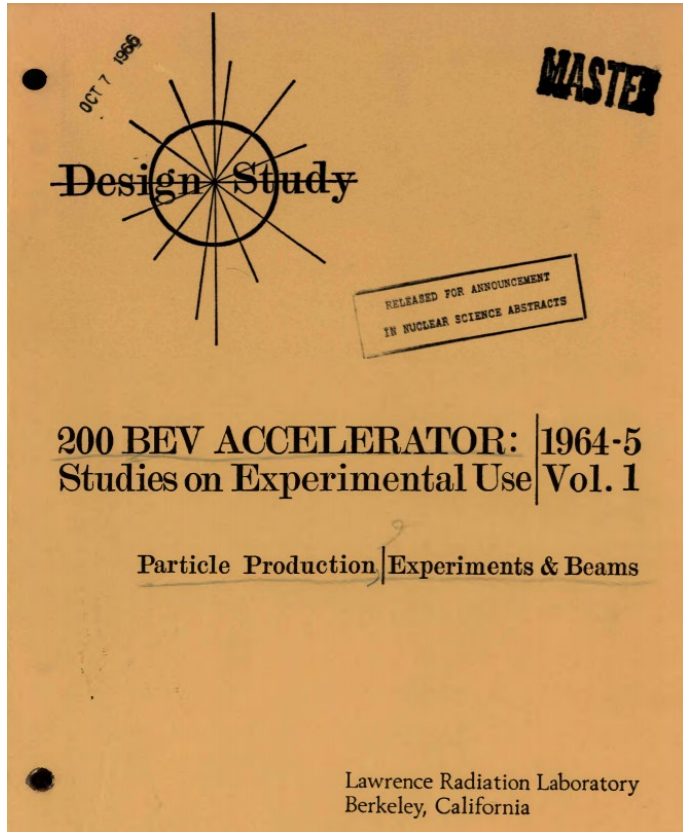
Berkeley Design Study (June 1965)



Pages of the design study

Fermilab Prehistory

Berkeley Design Study (June 1965)



“The design of the facility has been basically conservative, remaining reasonably close to the current state of the art, to insure reliable performance, rapid construction, and predictable costs.”

Fermilab Prehistory

Universities Research Association (November 1965)



URA Board of Trustees in 1972

Site Selection



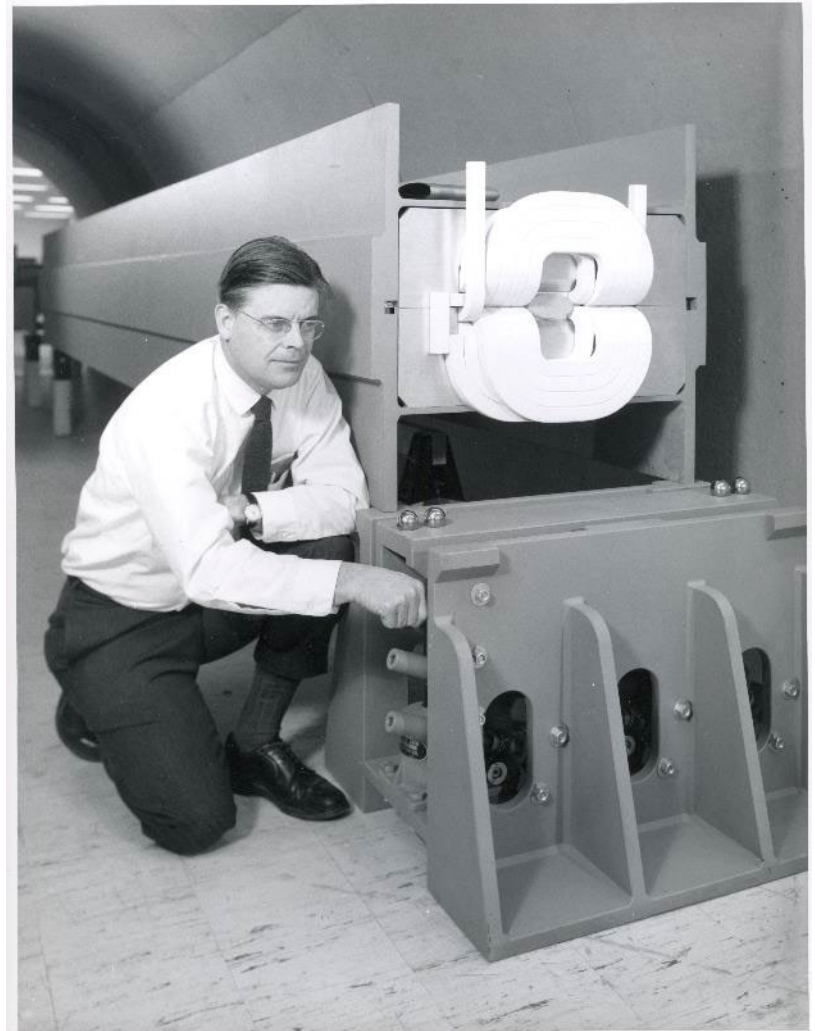
Aerial view of Weston, IL

Site Selection



Some of the other houses and barns on the site.

Director Selection



Robert R. Wilson accepted the directorship on February 28, 1967 and served until 1978

Robert R. Wilson



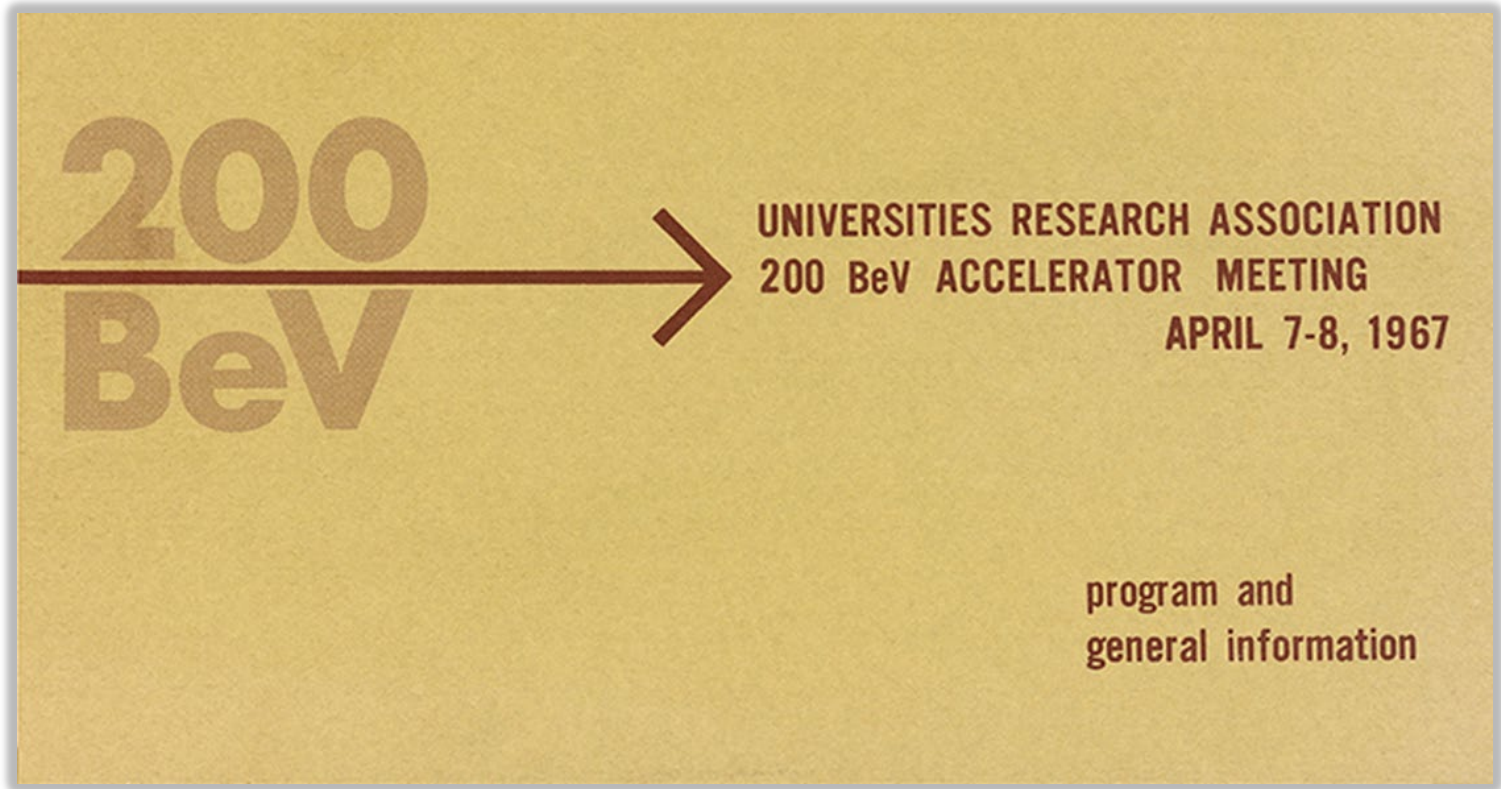
Robert R. Wilson accepted the directorship on February 28, 1967 and served until 1978

Oak Brook Offices



NAL staff started work at offices in Oak Brook on June 15, 1967

First Users Meeting



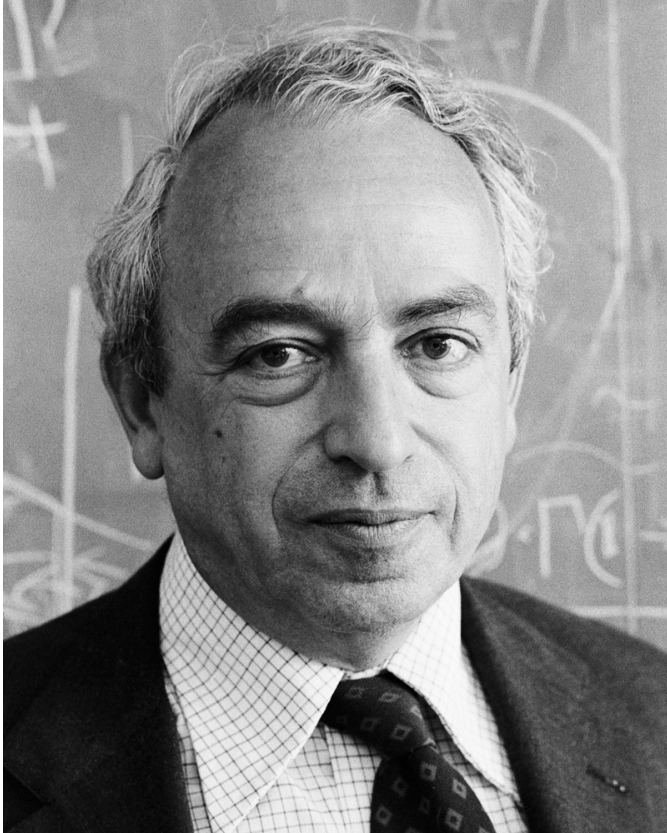
First Users Meeting held at Argonne National Lab on April 7-8, 1967

First Users Meeting

PROGRAM		FRIDAY, APRIL 7
9:00- 10:00 AM	REGISTRATION - COFFEE	
	MORNING SESSION CHAIRMAN - N. F. RAMSEY	AFTERNOON SESSION CHAIRMAN - E. L. GOLDWASSER
10:00 AM	WELCOME AND REMARKS BY THE HONORABLE OTTO KERNER, GOVERNOR OF THE STATE OF ILLINOIS	2:00 PM <u>STATUS AND PLANS, NATIONAL ACCELERATOR LABORATORY</u> COMMISSIONER G. F. TAPE - AEC ACTIVITIES N. F. RAMSEY - URA ACTIVITIES R. R. WILSON - PROJECT STATUS AND PLANS
10:30 AM	<u>THEORETICAL PROBLEMS REQUIRING HIGH ENERGIES</u> G. F. CHEW - STRONG INTERACTIONS T. D. LEE - WEAK INTERACTIONS	GENERAL DISCUSSION (COFFEE BREAK AT APPROXIMATELY 3:15 PM)
1:00 PM	LUNCH - ARGONNE CAFETERIA	4:30 PM <u>EXTENDIBLE ENERGY ACCELERATOR</u> G. LAMBERTSON
		5:00 PM TRIP TO PHEASANT RUN VIA LABORATORY SITE
		6:00 PM COCKTAILS, PHEASANT RUN
		7:00 PM DINNER, PHEASANT RUN

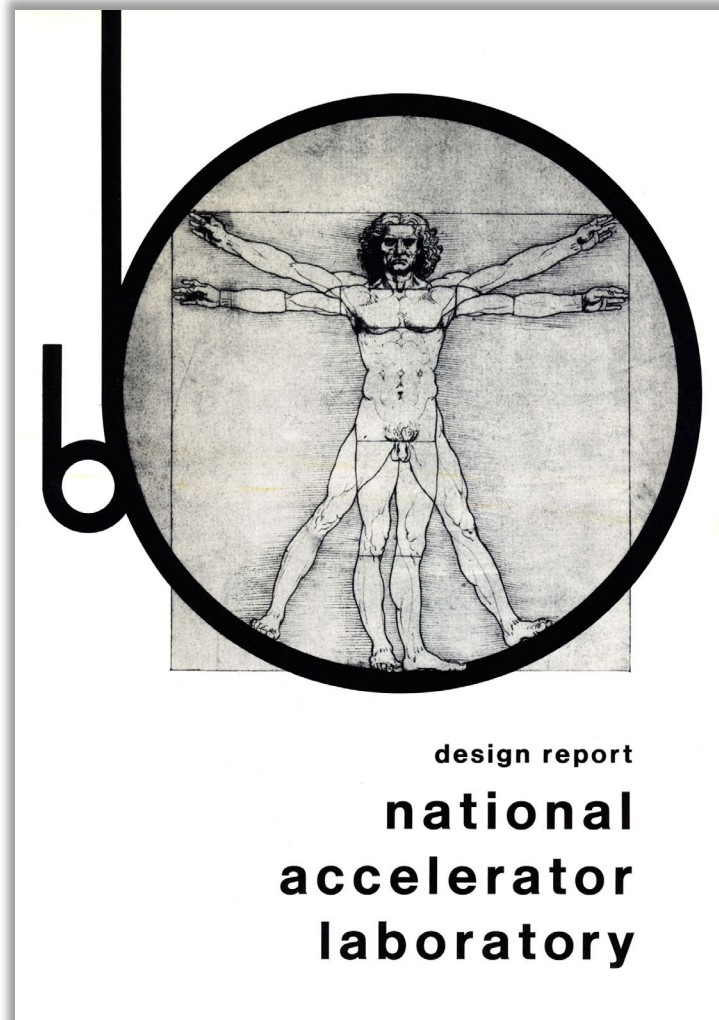
First Users Meeting held at Argonne National Lab on April 7-8, 1967

First Users Meeting



“Wilson took the opportunity to explain that the lab was really a national lab. Until that time, although laboratories had ‘national’ in their names, they were really regional. Wilson and I wanted the users to be people who not only visited the lab, but who were involved in the design.”

NAL Design Report



NAL staff completed the NAL Design Report in January 1968

Move to Lab Site



Flag raising on September 24, 1968

Linac Groundbreaking



December 1, 1968

1968 Users Meeting



Robert R. Wilson speaking at the NAL Users Meeting on December 2, 1968

Main Ring Groundbreaking



October 3, 1969

Main Ring Construction



Main Ring Construction

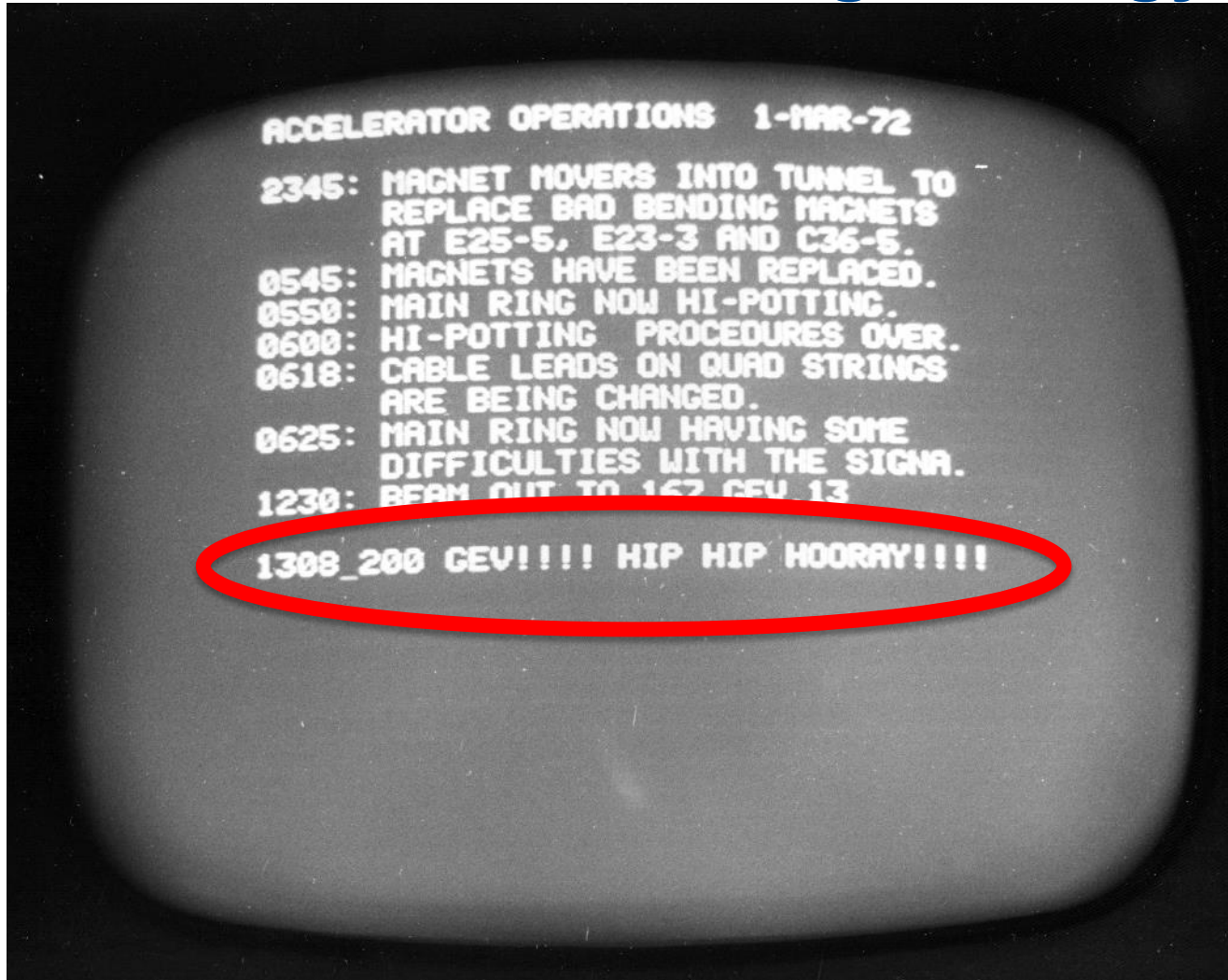


Accelerator Reaches Design Energy



March 1, 1972: The accelerator reaches design energy of 200 GeV

Accelerator Reaches Design Energy



March 1, 1972: The accelerator reaches design energy of 200 GeV

Wilson receives 1973 National Medal of Science



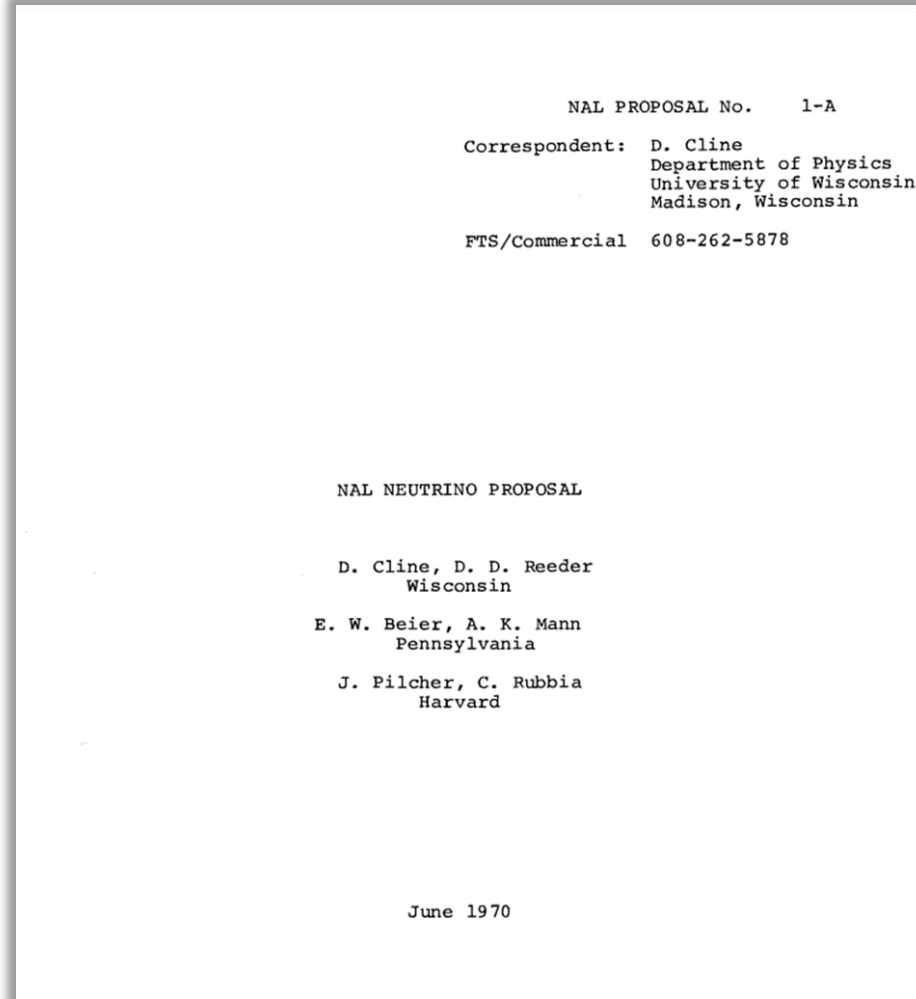
“For unusual ingenuity in designing experiments to explore the fundamental particles of matter and in designing and constructing the machines to produce the particles, culminating in the world's most powerful particle accelerator.” October 10, 1973

Experimental Program Begins



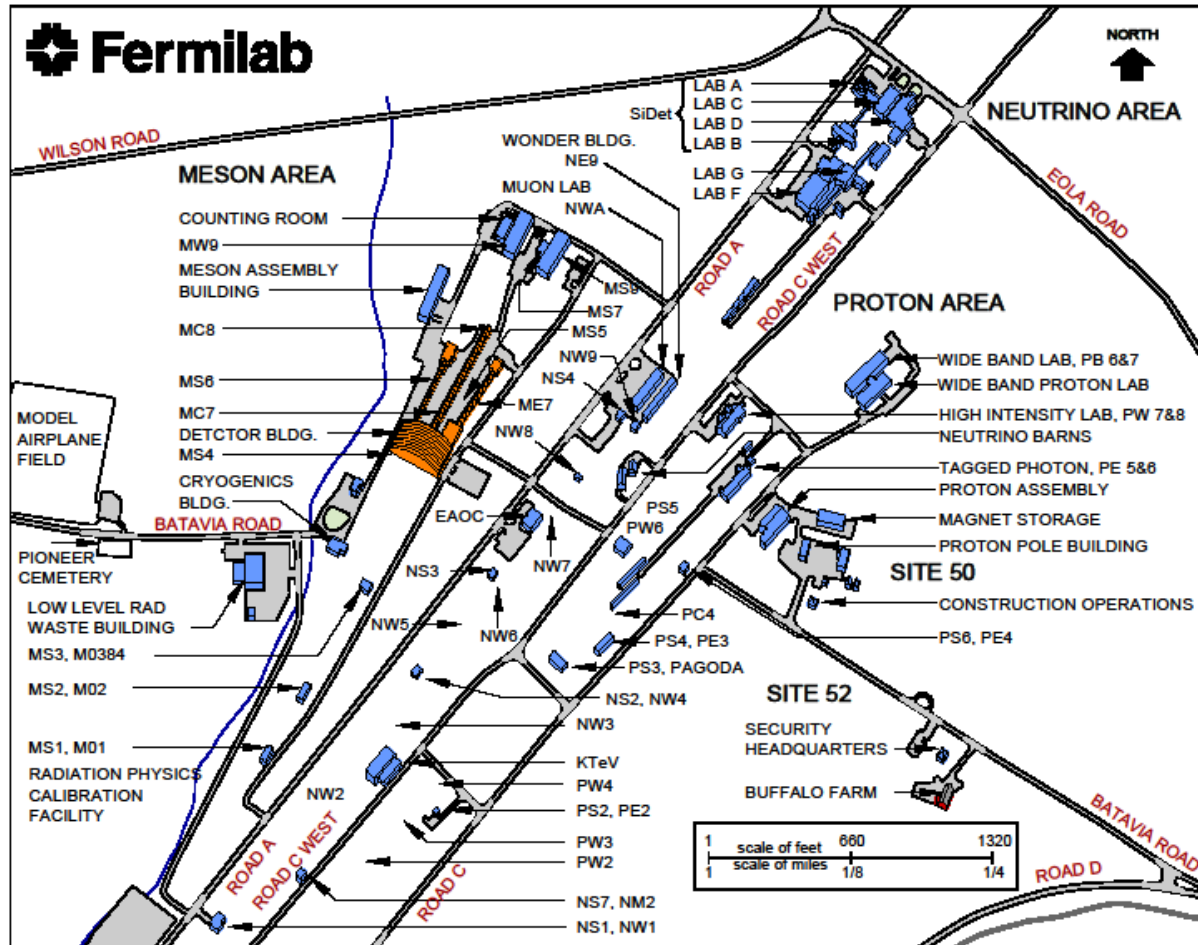
Lab's first experiment, E-36, began taking data on February 12, 1972

Experimental Program Begins



First experiment proposal

Experimental Areas



A recent map of the experimental areas

Experimental Areas



Proton Pagoda



Meson Lab

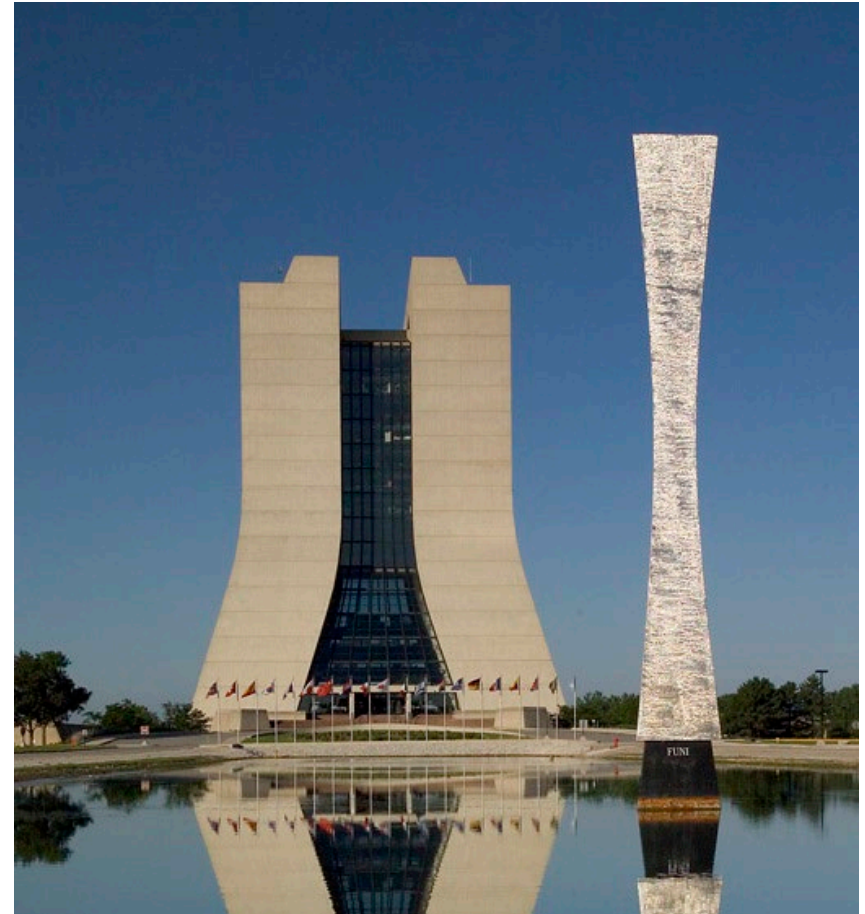


Neutrino Geodesic Dome

Art and Design



Möbius Strip



Acqua Alle Funi

Sculptures by Robert R. Wilson

Art and Design



Broken Symmetry

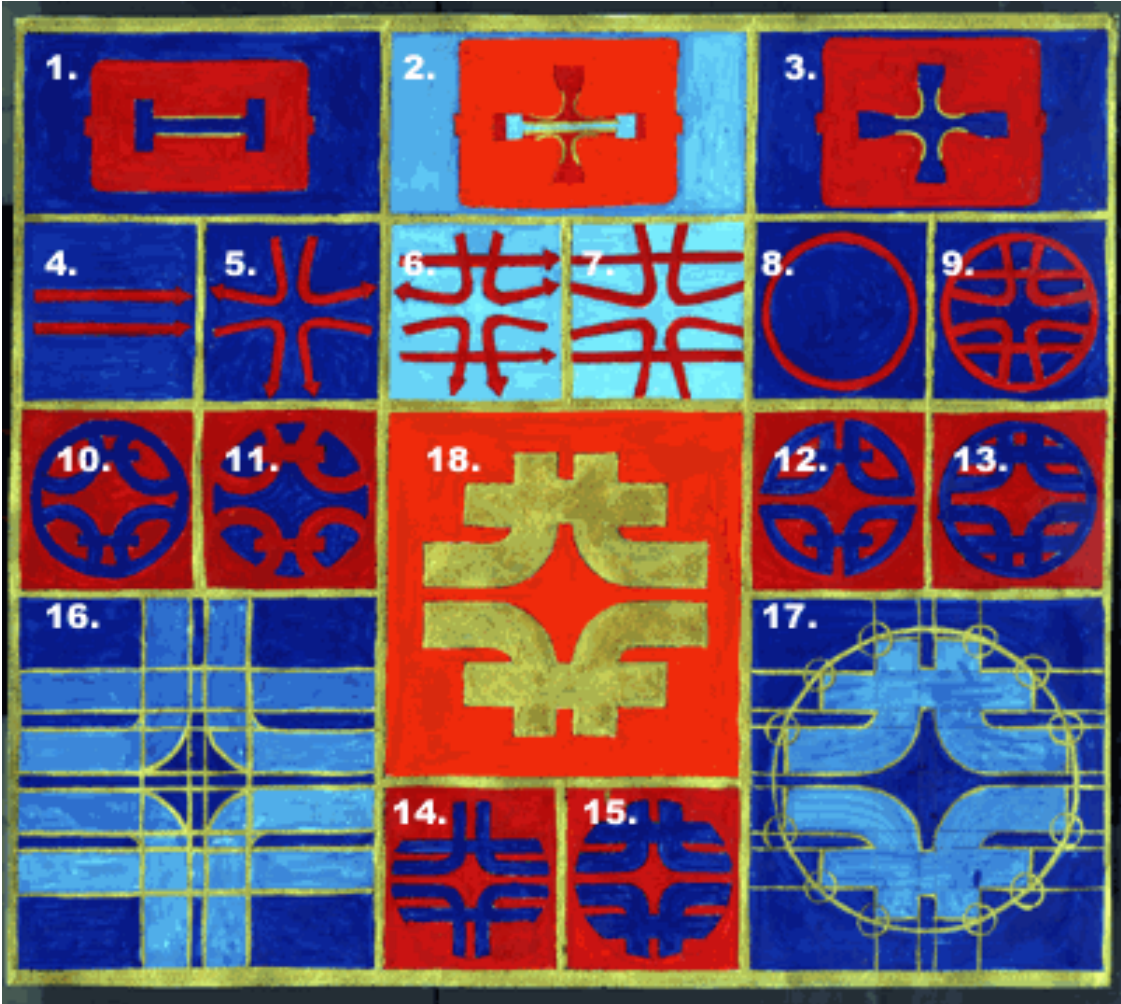
Sculptures by Robert R. Wilson

Art and Design



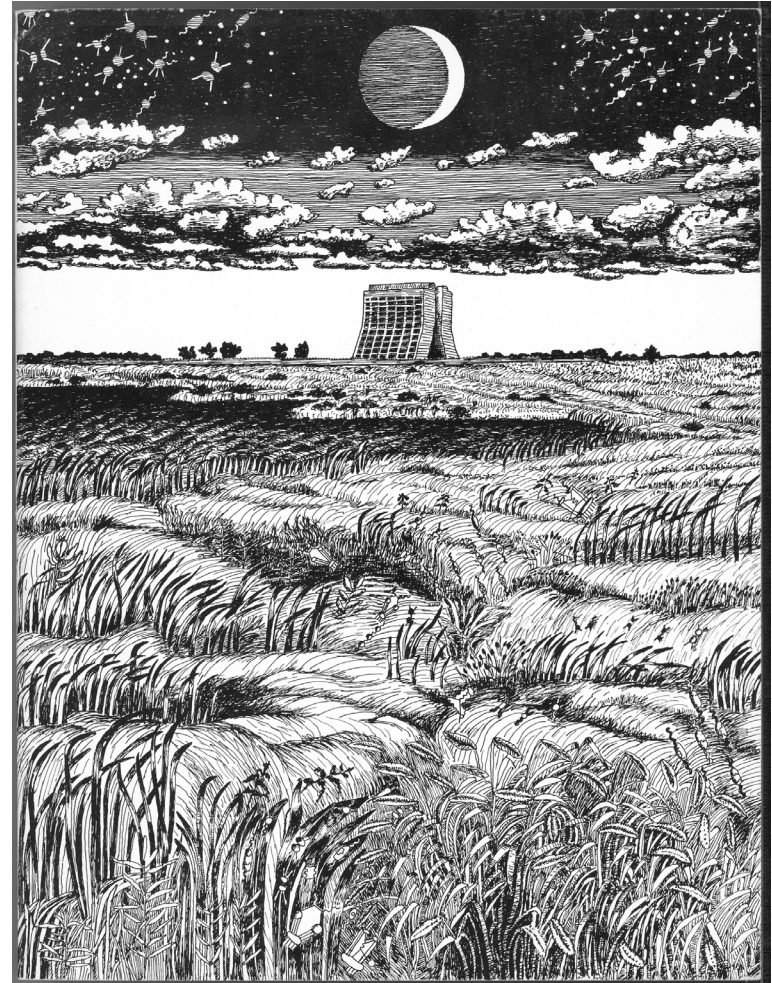
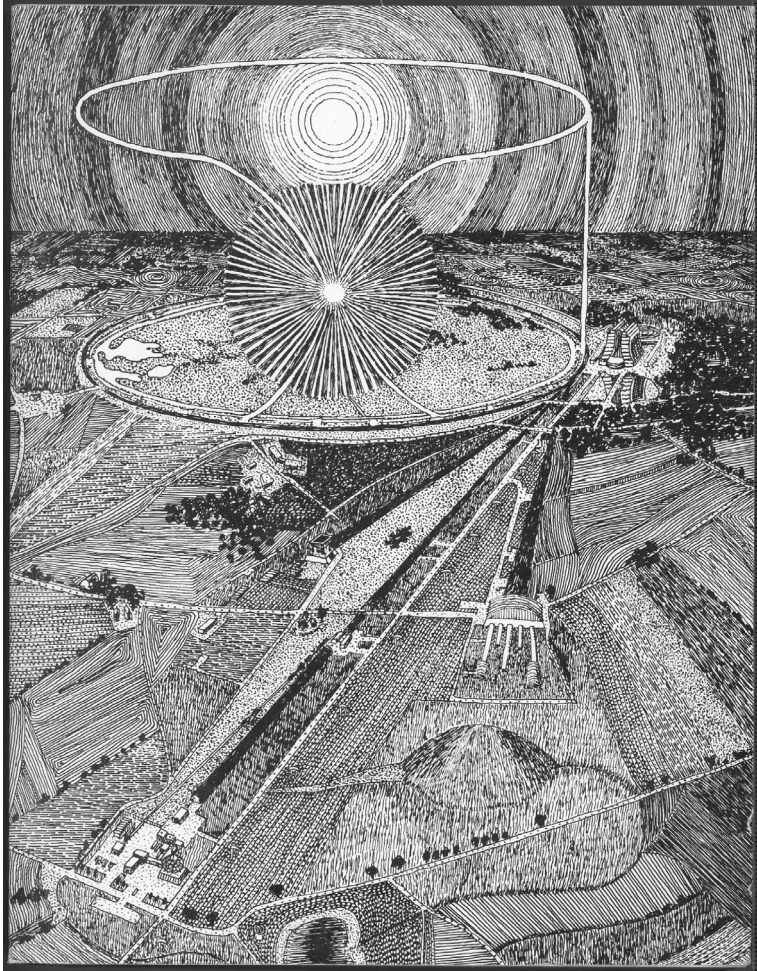
Angela Gonzales developed the lab color scheme: Blues, oranges, and reds.

Art and Design



Angela Gonzales designed the lab logo

Art and Design



Angela Gonzales artwork for publication covers

Site Environment



May 2, 1969: First Arbor Day at the lab; June 1969: Article urging preservation of trees

Bison



First bison arrive in late 1969

Bison



Bison in 2016

Prairie Restoration



The prairie restoration began in 1974.

Construction of Wilson Hall



Construction of Wilson Hall began in 1971.

Construction of Wilson Hall



Construction of Wilson Hall was completed in 1973

Dedication of Fermilab



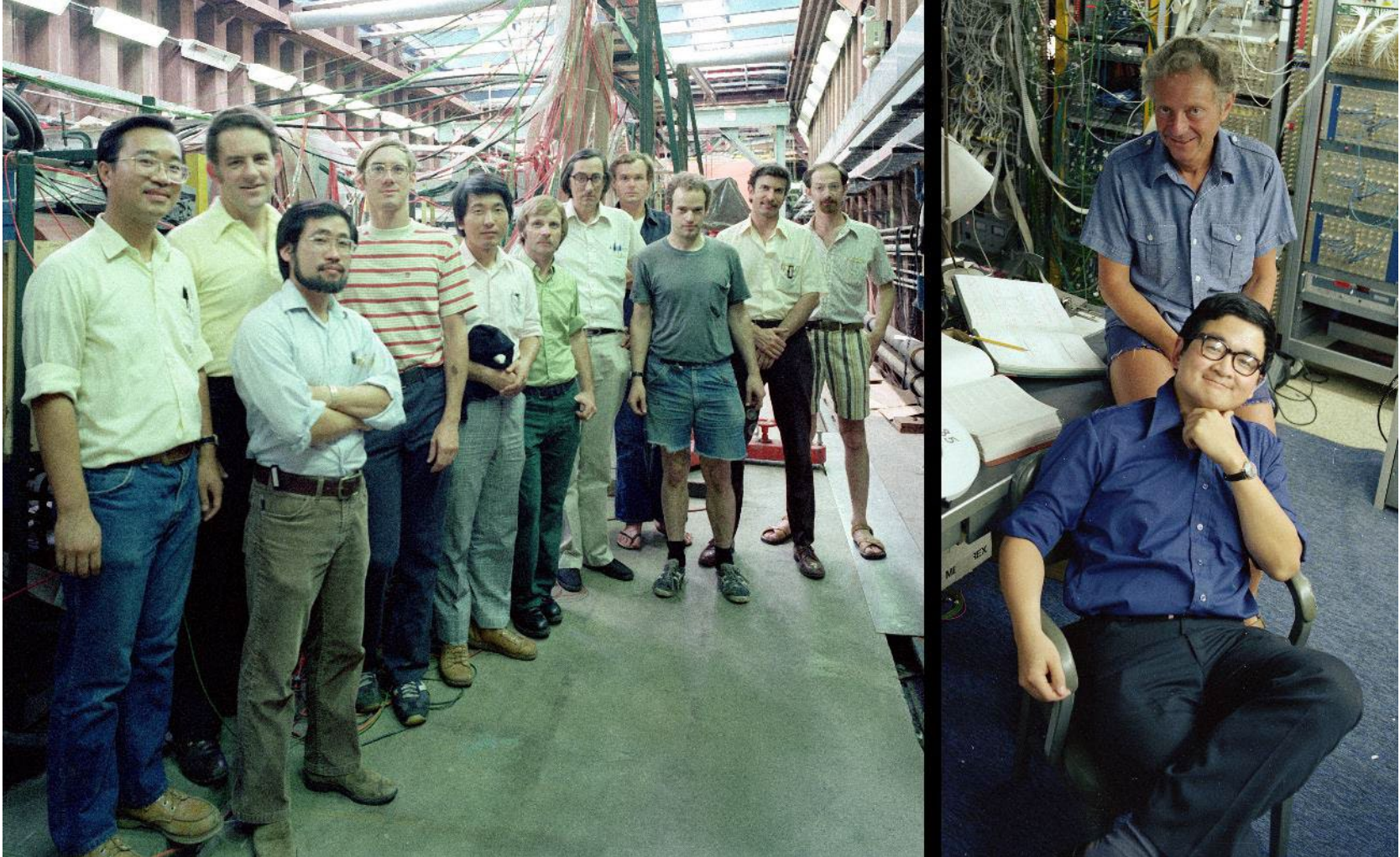
NAL was dedicated as Fermi National Accelerator Laboratory on May 11, 1974

Dedication of Fermilab



NAL was dedicated as Fermi National Accelerator Laboratory on May 11, 1974

Discovery of the Bottom Quark



Paper announcing E-288's discovery received by publishers on July 1, 1977

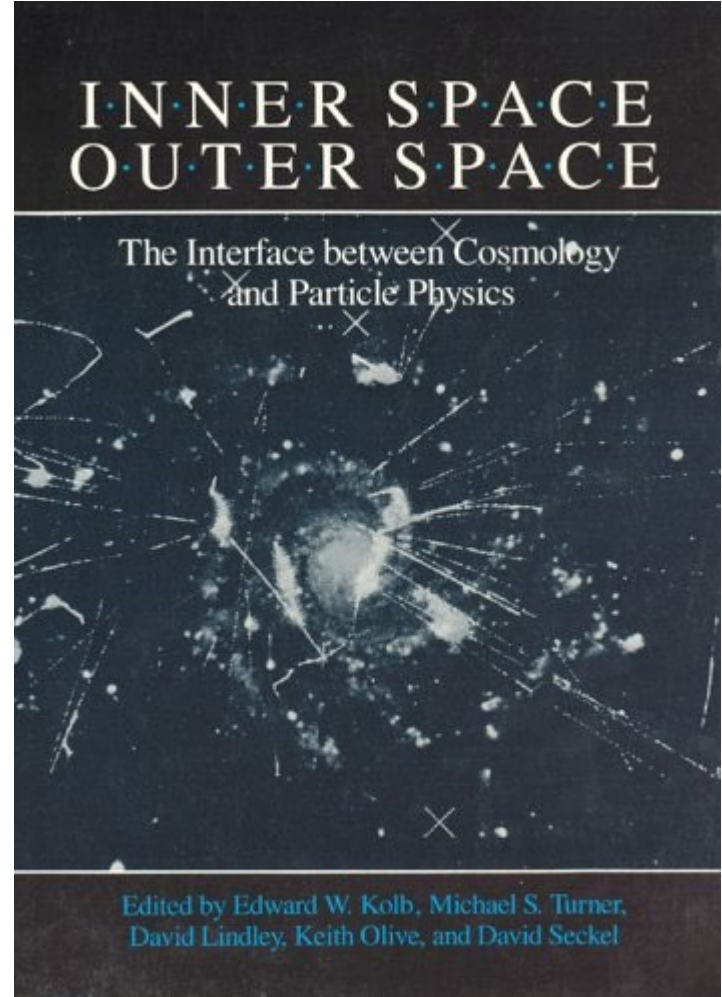
Hub of Scientific Collaboration



Since its early days, Fermilab has hosted conferences and events of international significance.



Hub of Scientific Collaboration



Since its early days, Fermilab has hosted conferences and events of international significance.

Hub of Scientific Collaboration



Ben Lee Memorial Conference (1977), Users Meeting (2012), LBNF/DUNE Public Meeting (2015)

Community Building



NALREC Picnic, August 15, 1976

Community Building



Festa Italiana, June 14, 2016

Community Building



Festa Italiana, yesterday

Community Building



Labwide parties: 15th anniversary (1982)

Community Building



Labwide parties: 512 GeV party (1983)

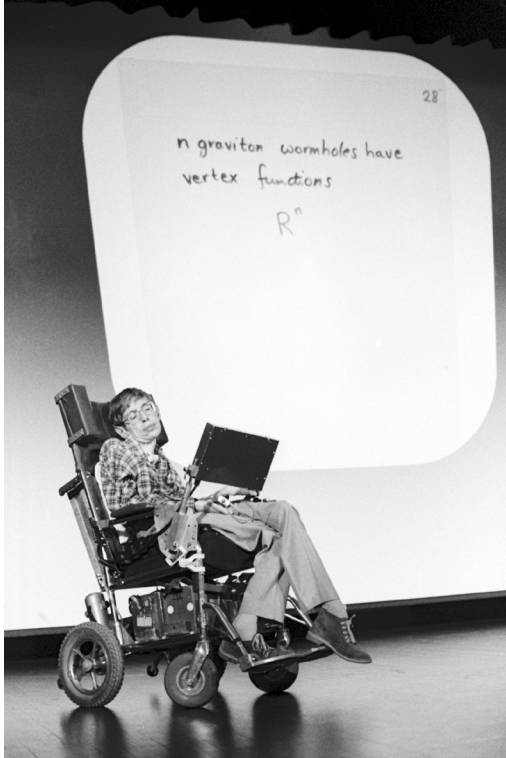
Community Building



Labwide parties: 2022 summer picnic, 2022 holiday party

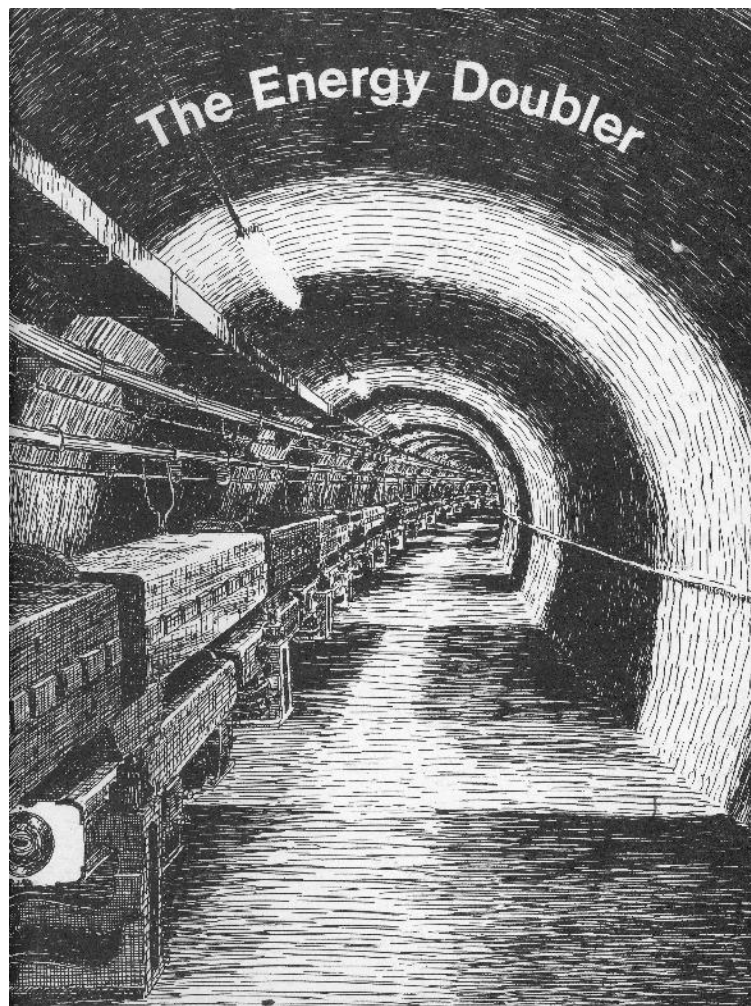


Community Building



Talks by Carl Sagan (1976), Jane Goodall (1977), Stephen Hawking (1989)

Tevatron



Artwork by Angela Gonzales

Robert Wilson Resigns

The Village Crier



fermi national accelerator laboratory

Operated by Universities Research Association Inc.
Under Contract with the U.S. Department of Energy

Vol. 10, No. 7

February 16, 1978

WILSON SUBMITS RESIGNATION

Robert R. Wilson resigned Feb. 9 as Director of the Fermi National Accelerator Laboratory.

The announcement was made by Norman F. Ramsey, president of Universities Research Association. A consortium comprising 53 universities, URA operates Fermilab under contract with the Department of Energy. Ramsey said the problem of inadequate funding led Wilson to resign and indicated the loss of Wilson as director would be a severe blow.

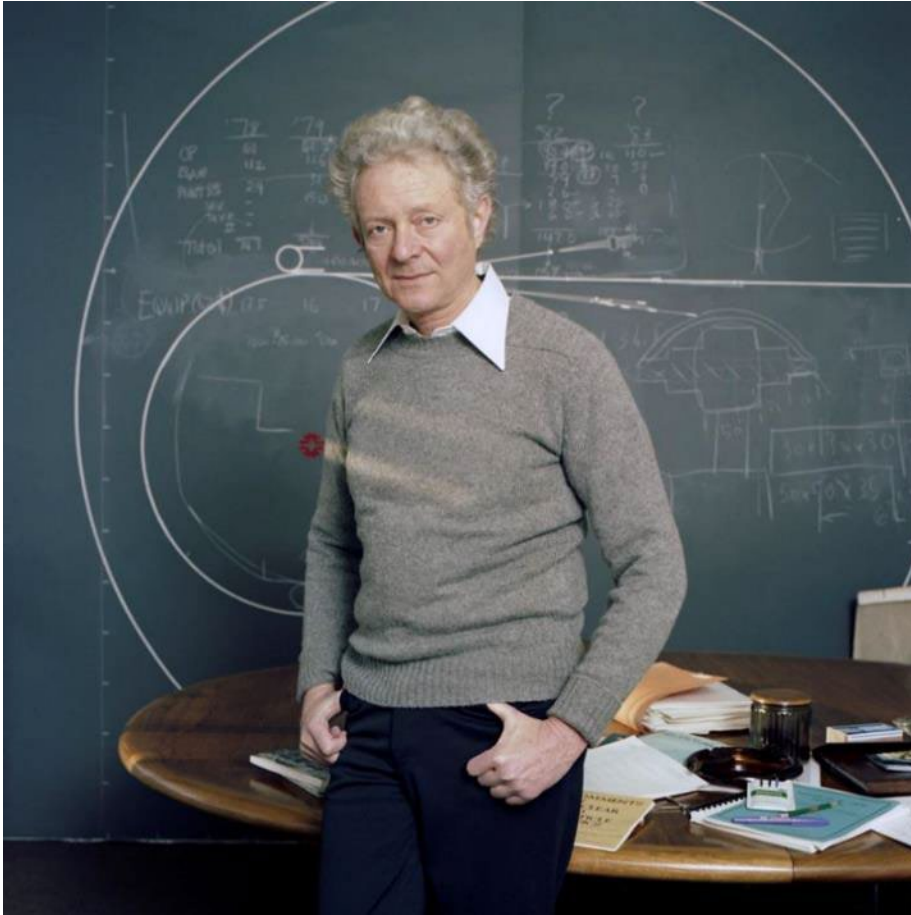
In his resignation letter Dr. Wilson wrote:

"In this letter I regretfully tender my resignation. In a previous communication I expressed my concern that the future viability of Fermilab is threatened because the funding has been below that necessary to operate the existing facilities responsibly; presently we are operating at about half of our capacity to do studies essential



Fermilab newsletter announces the director's resignation

Leon Lederman Becomes Director



Lederman would serve as director from 1979 to 1989

Saturday Morning Physics



Lederman speaks to a Saturday Morning Physics class in 1980

Lederman Science Education Center



Dedicated in 1992

Tevatron



Tevatron achieves world record energy of 512 GeV on July 3, 1983

Tevatron



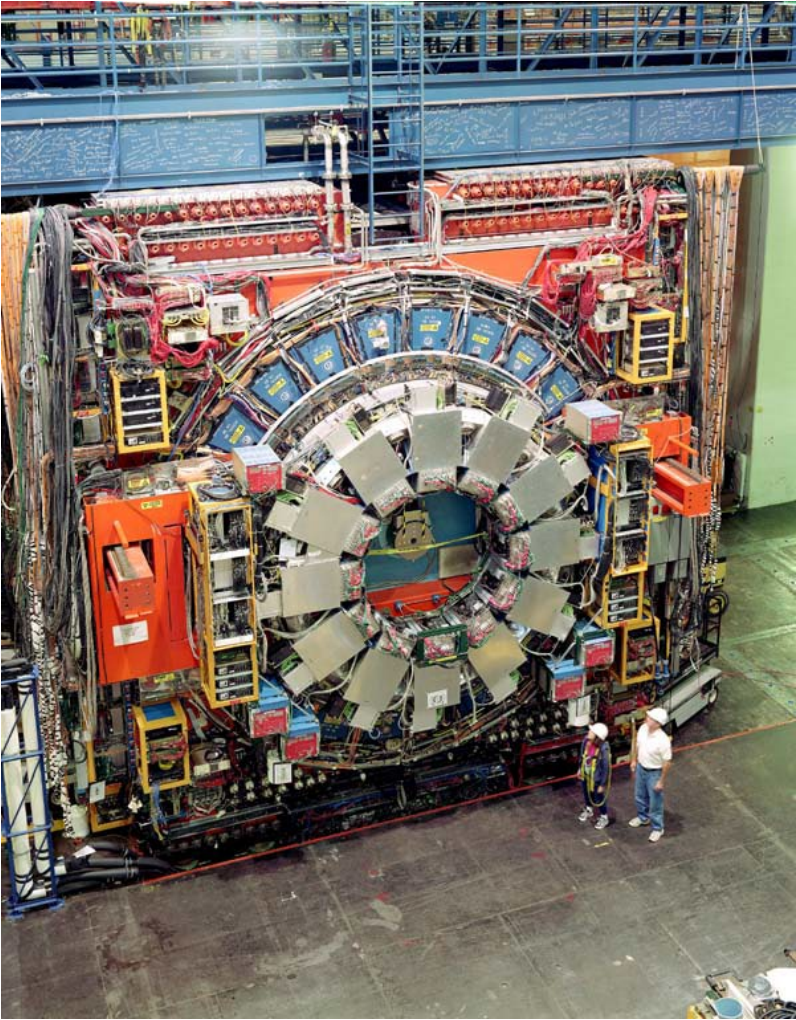
The Tevatron collider was dedicated on October 11, 1985

Tevatron

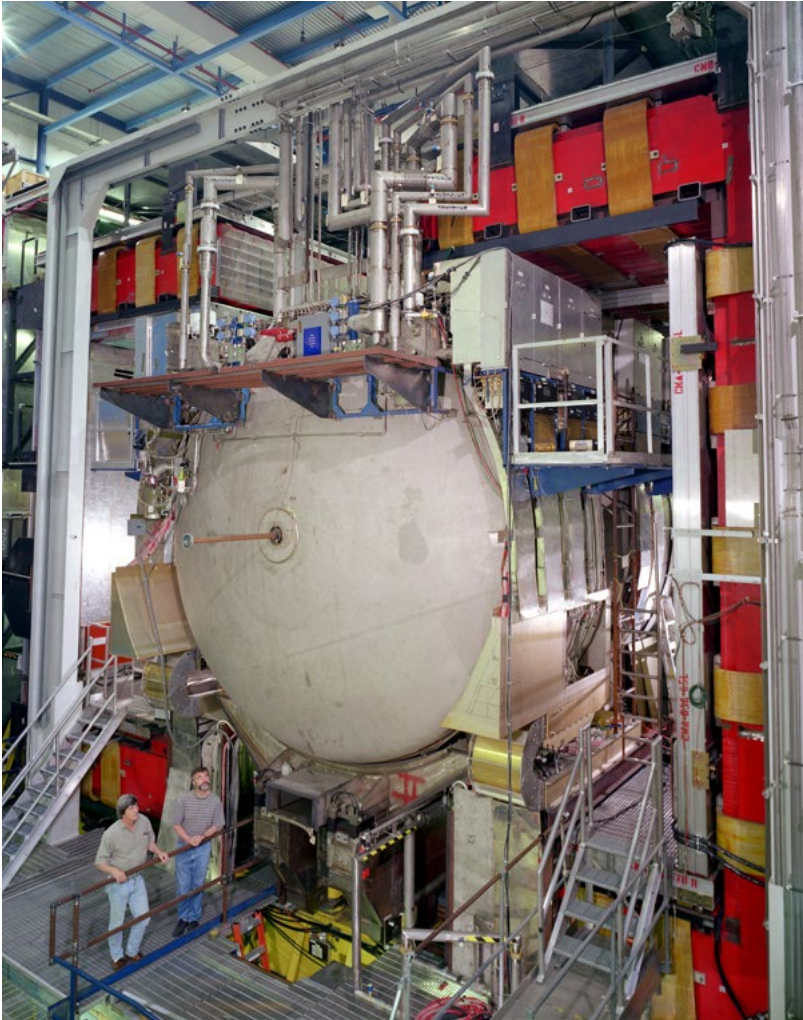


Rich Orr, Dick Lundy, Helen Edwards, and Alvin Tollestrup receive the 1989 National Medal of Technology for their work on the Tevatron

CDF and DZero



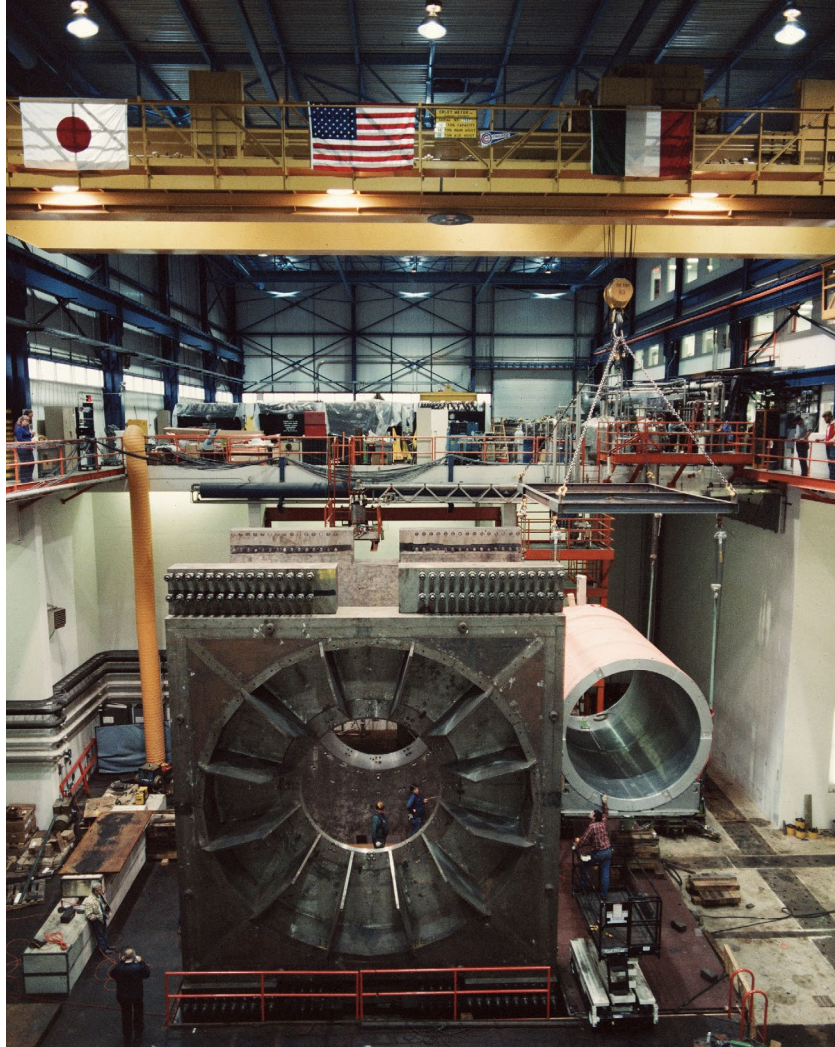
CDF



DZero

CDF and DZero





Established in 1980 as a collaboration between the U.S., Italy, and Japan

CDF and DZero



CDF



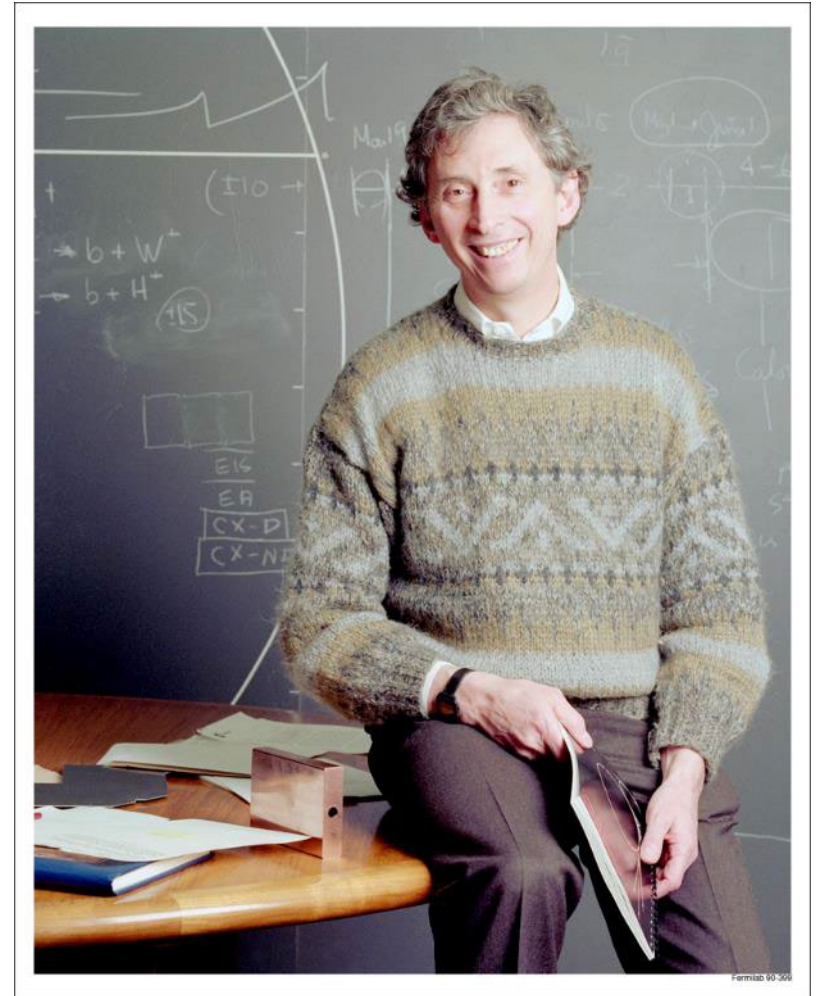
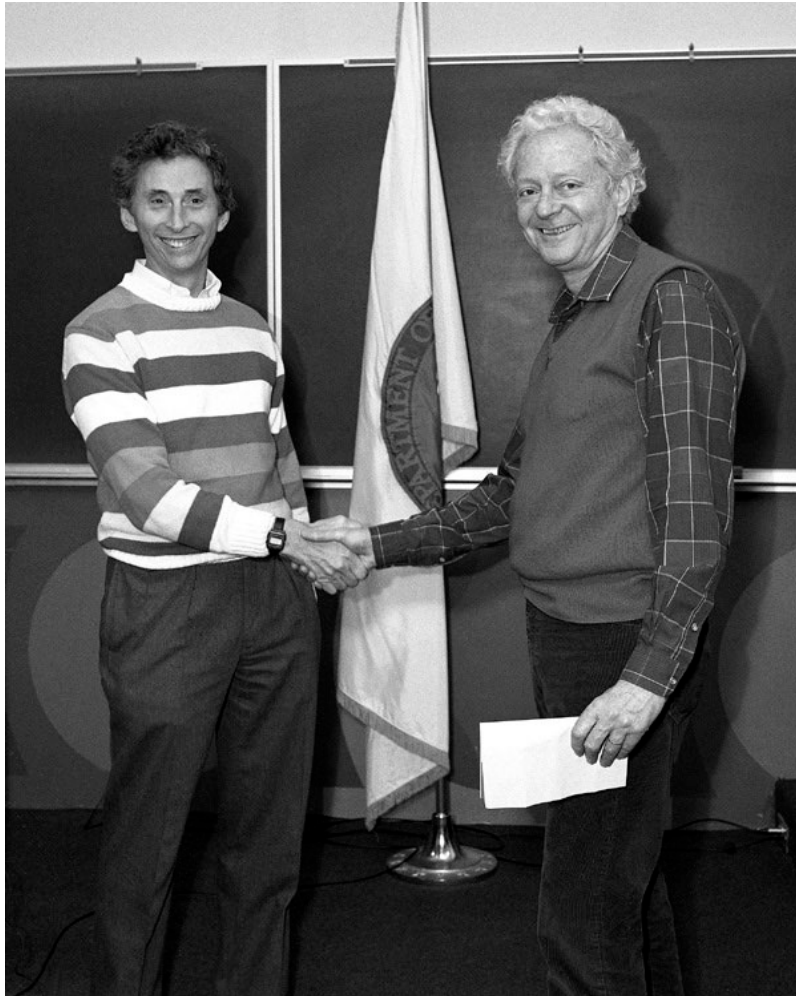
DZero

Leon Lederman Wins Nobel Prize, 1988



Leon Lederman receiving the Nobel Prize in 1988

John Peoples Becomes Director



John Peoples became director in 1989 and served until 1999

Top Quark Discovery, 1995



March 2, 1995: Top Quark Discovery Announcement Seminar and Press Conference

Top Quark Discovery, 1995



L to R: Gioglio Bellettini, Paul Grannis, John Peoples, Hugh Montgomery, Bill Carithers

Main Injector



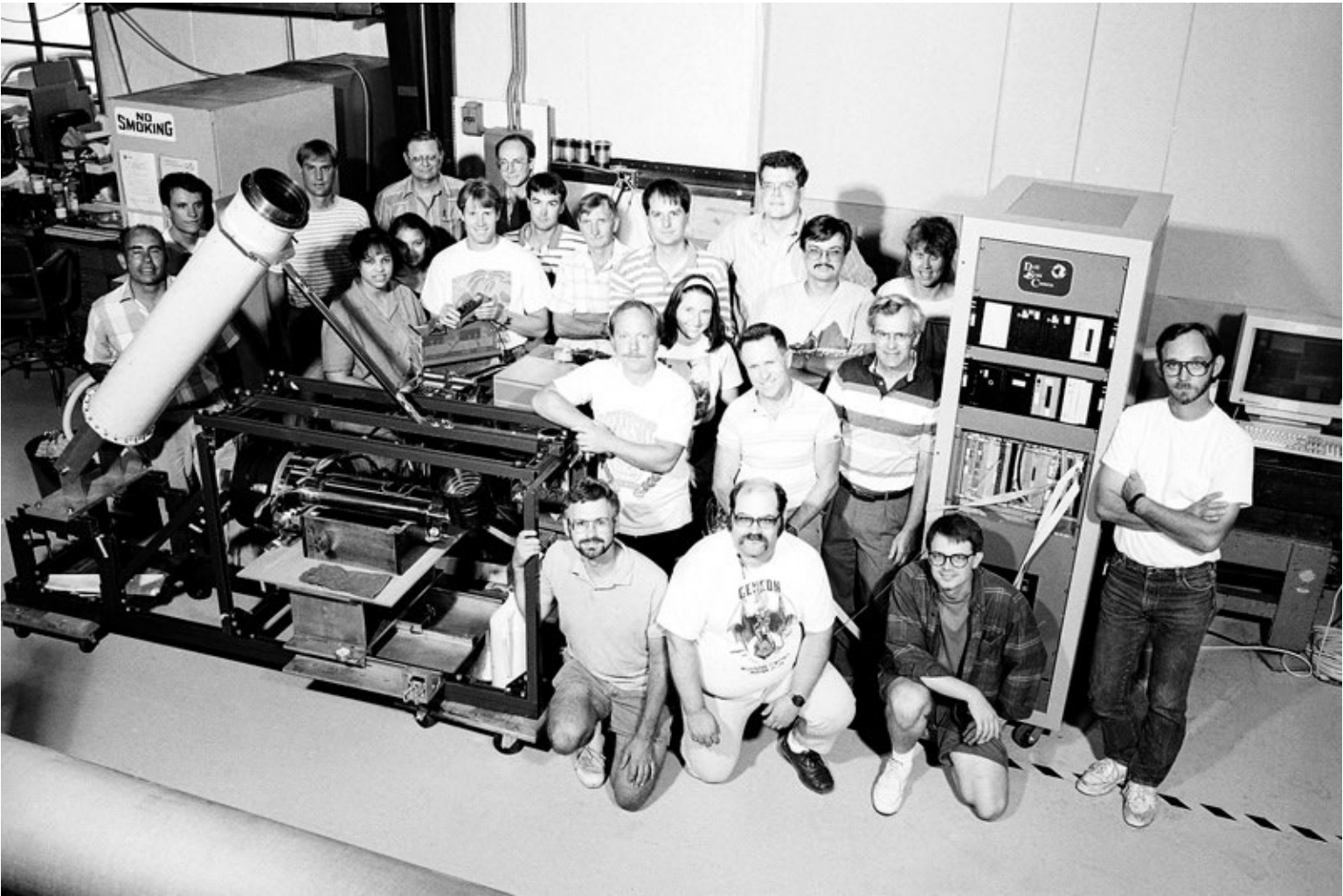
Main Injector groundbreaking on March 22, 1993

Main Injector



Main Injector completed in 1999

Sloan Digital Sky Survey



Sloan Digital Sky Survey Collaboration in 1993

Sloan Digital Sky Survey



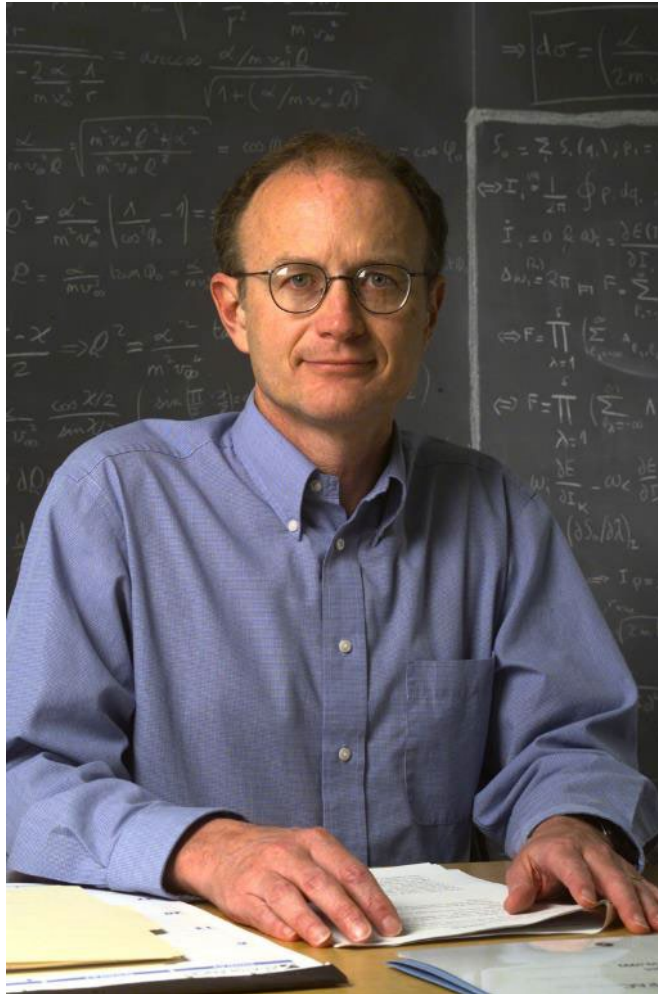
Sloan Digital Sky Survey 2.5 m telescope in 2000

Fermilab and the Web

FERMILAB COMPUTING DIVISION	
Computing[1]	Documentation: General[2], Offline Products[3], Online (DOCDB) [4]
INFO[5]	Access to Fermilab and Computing Division announcements.
H E P[6]	World Wide Web services provided by other High Energy Physics Laboratories, CERN[7], SLAC[8]
Spires[9]	Access to Spires preprint database.
Help[10]	Fermilab Help Page for WWW
WWW[11].	Information on the World-Wide Web project.

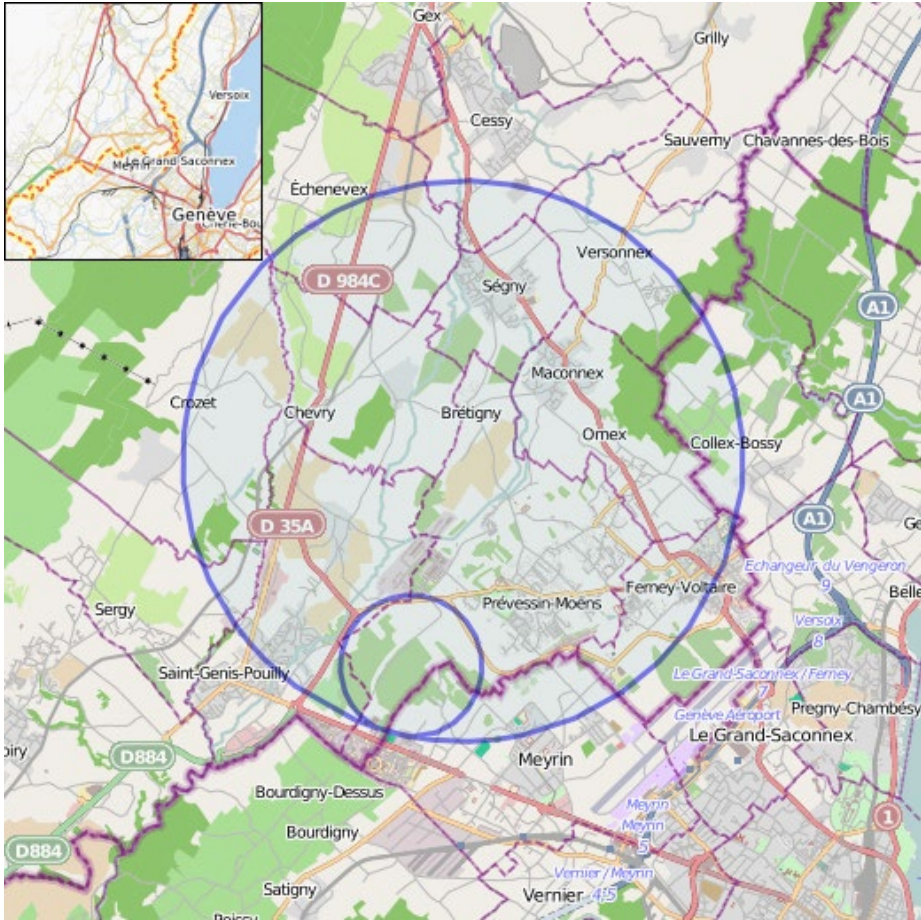
Fermilab's first webpage from late 1992

Mike Witherell Becomes Director



He served as director from 1999 to 2005

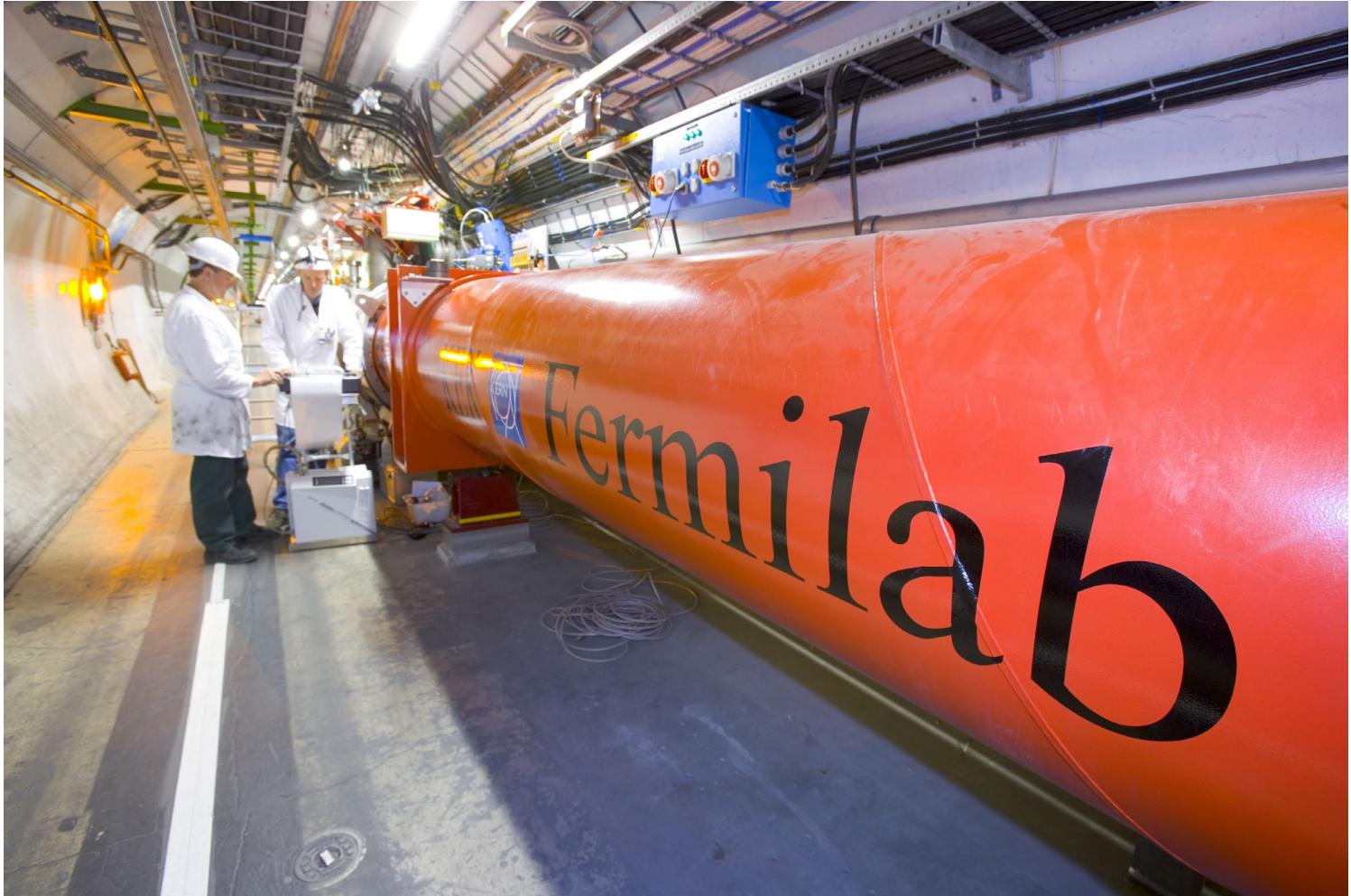
On the Horizon: Large Hadron Collider



Construction on the LHC started in 1998.

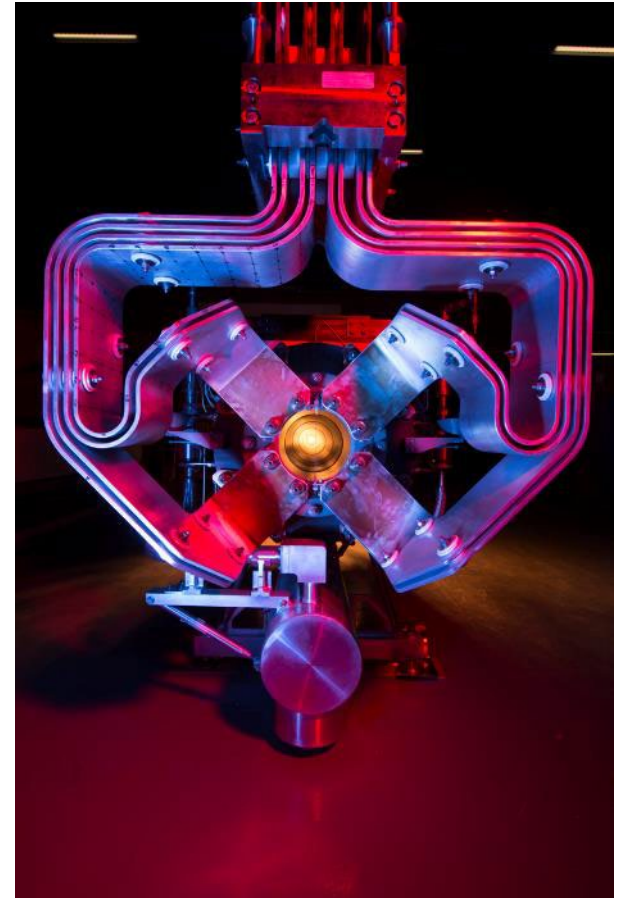
Image via https://en.wikipedia.org/wiki/File:Location_Large_Hadron_Collider.PNG

On the Horizon: Large Hadron Collider



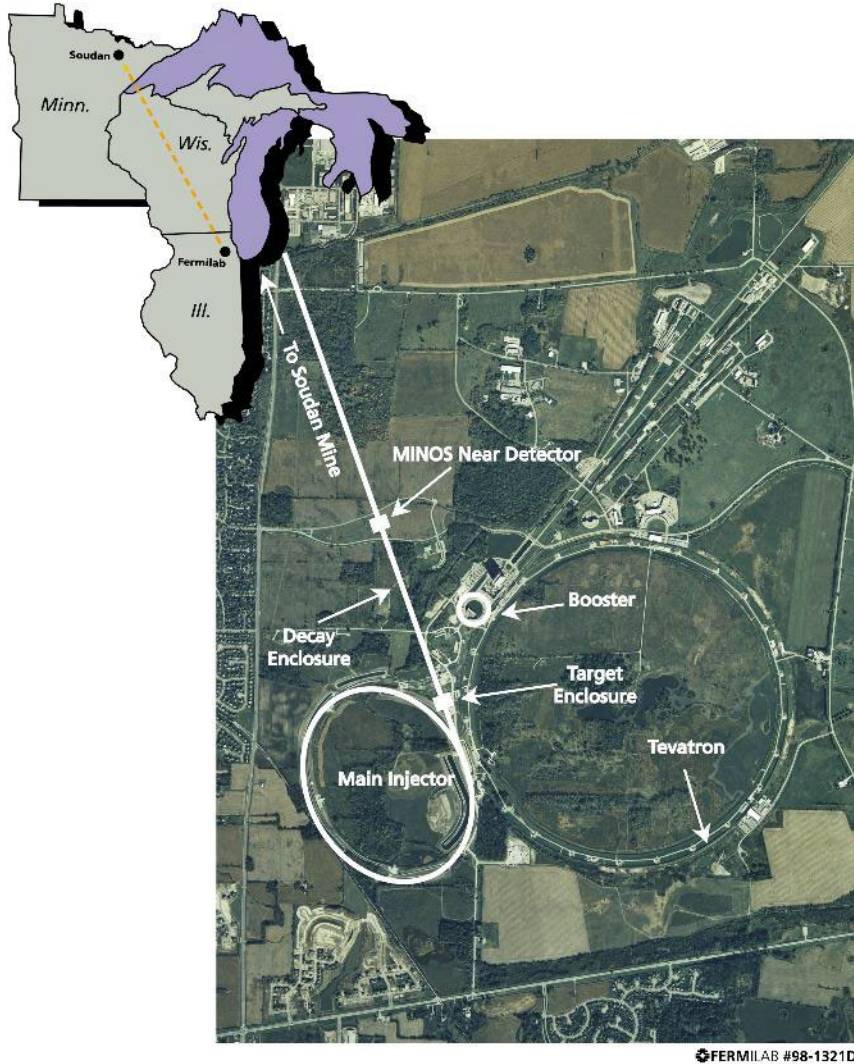
Some of the LHC magnets were designed, developed, manufactured and tested at Fermilab.

NuMI



The NuMI beam was completed in 2005, setting the stage for more neutrino experiments

MINOS



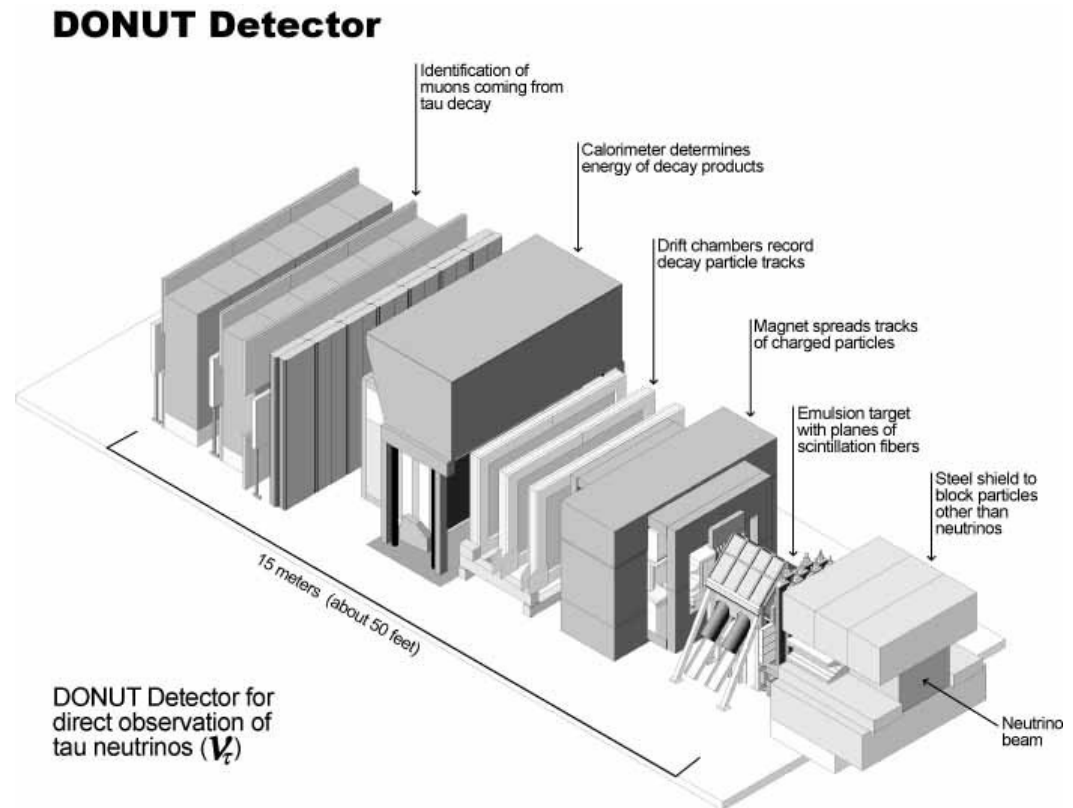
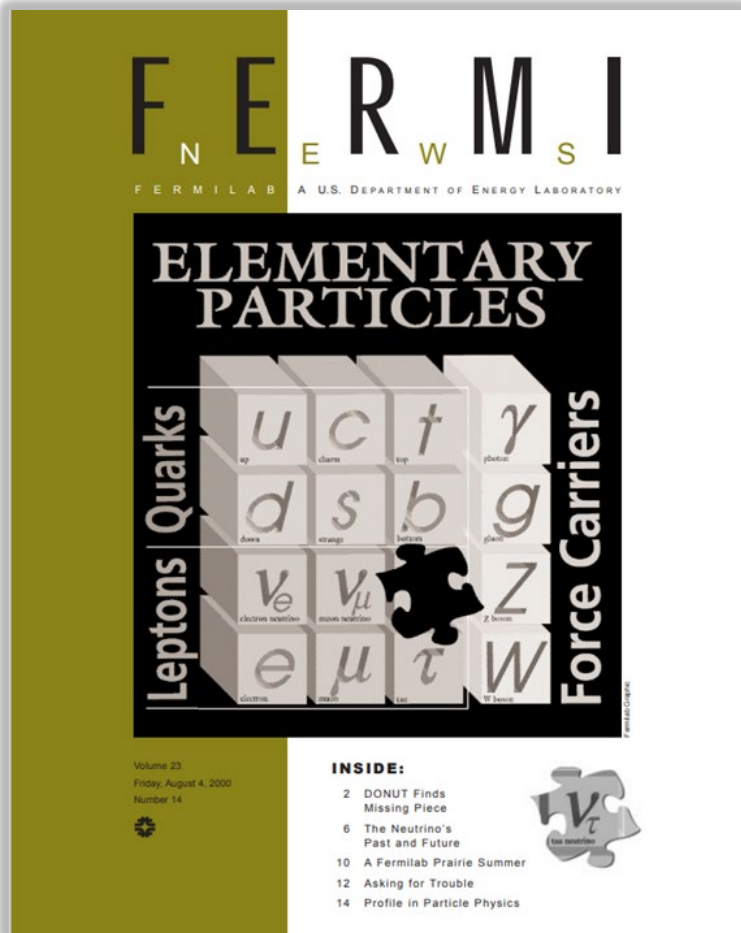
Groundbreaking for MINOS Detector Hall in the Soudan Mine, Minnesota in 1999

MINOS



MINOS starts on March 4, 2005

DONUT Observes the Tau Neutrino



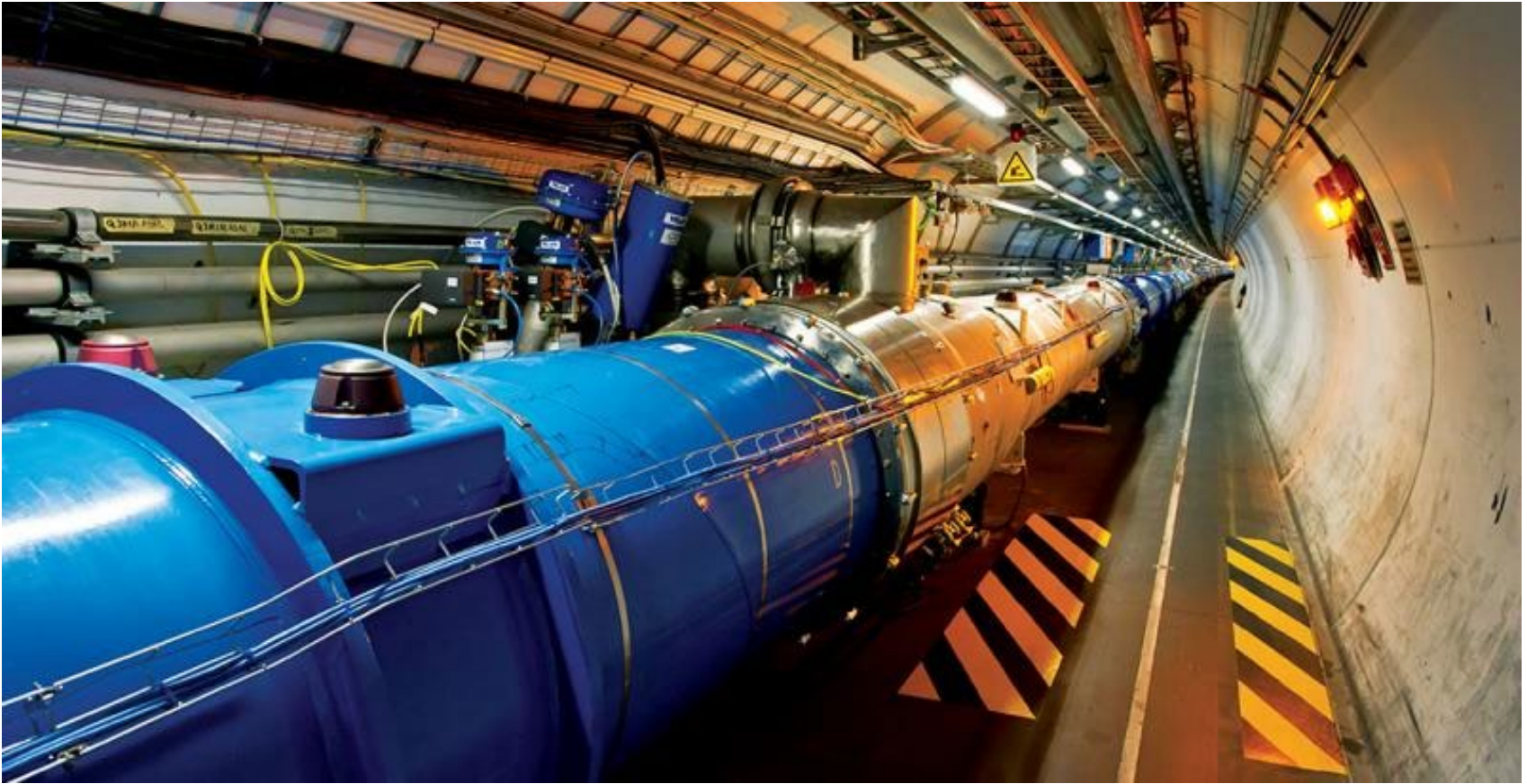
Announced July 21, 2000

Pier Oddone Becomes Director



He served as director from 2005 to 2013

LHC (Large Hadron Collider) at CERN



The LHC was completed in 2008, becoming the world's most powerful accelerator

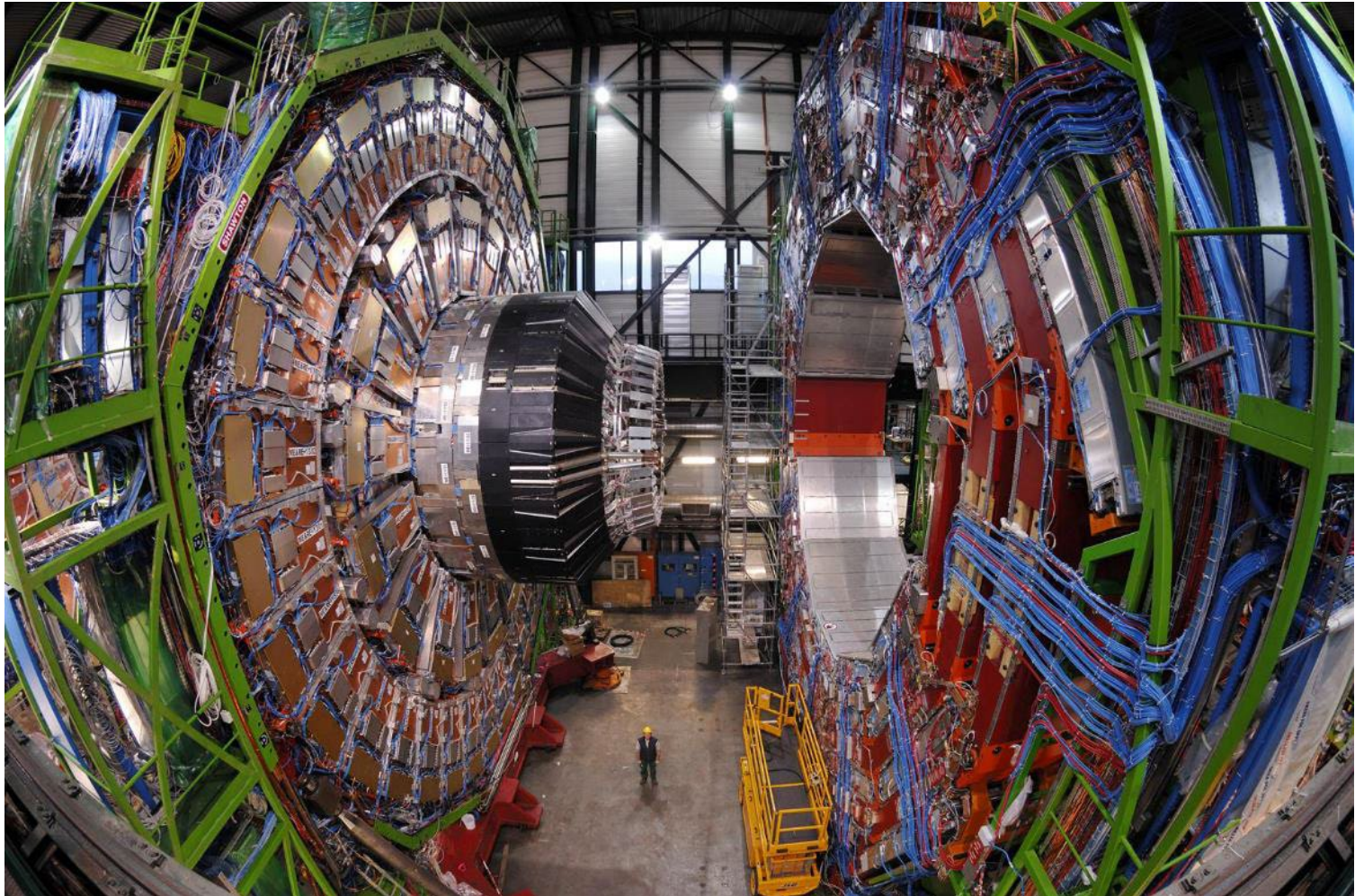
Image via <http://home.cern/topics/large-hadron-collider>)

LHC (Large Hadron Collider) at CERN



LHC first beam pajama party at Fermilab on September 10, 2008

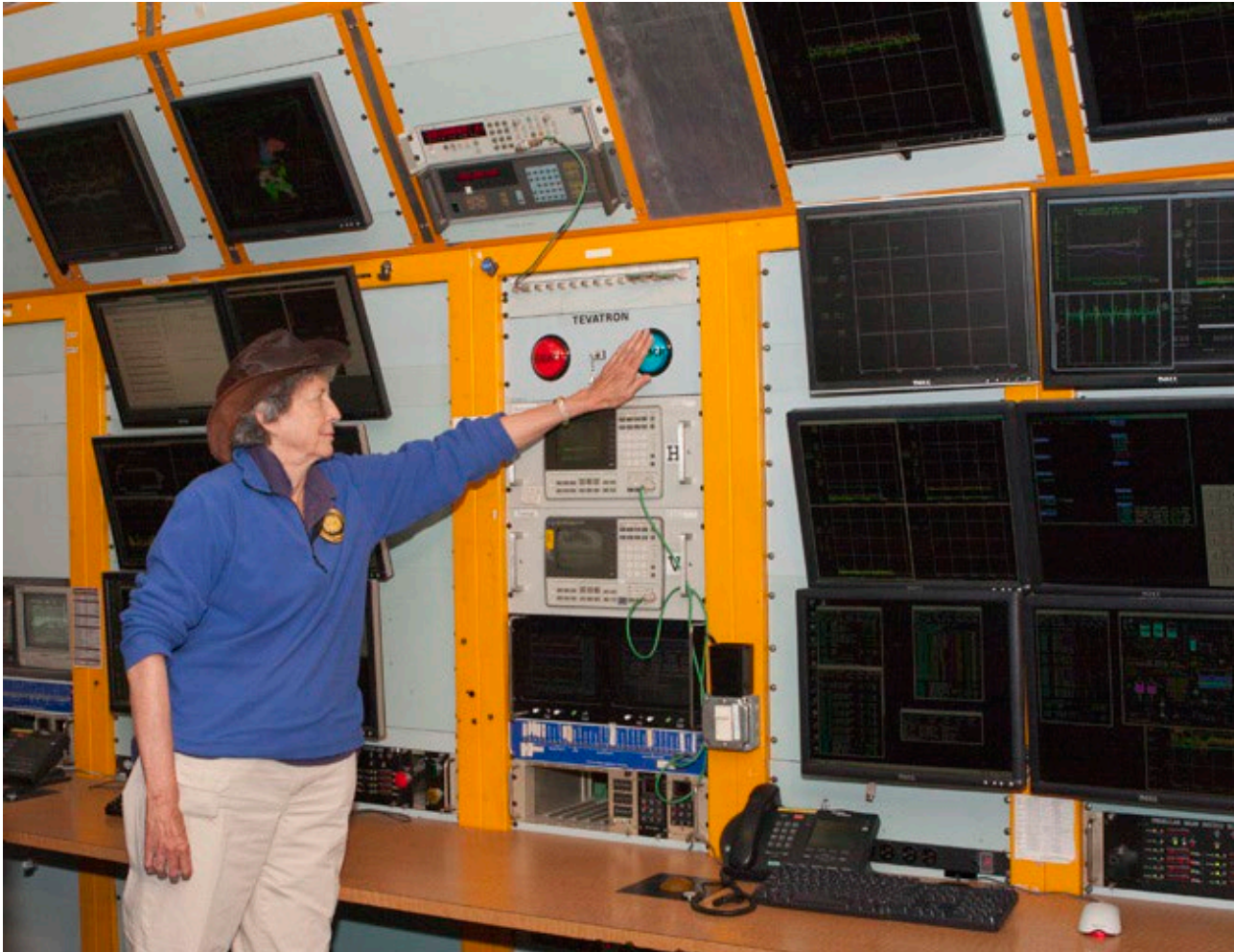
CMS Detector Completed at CERN



January 22, 2008

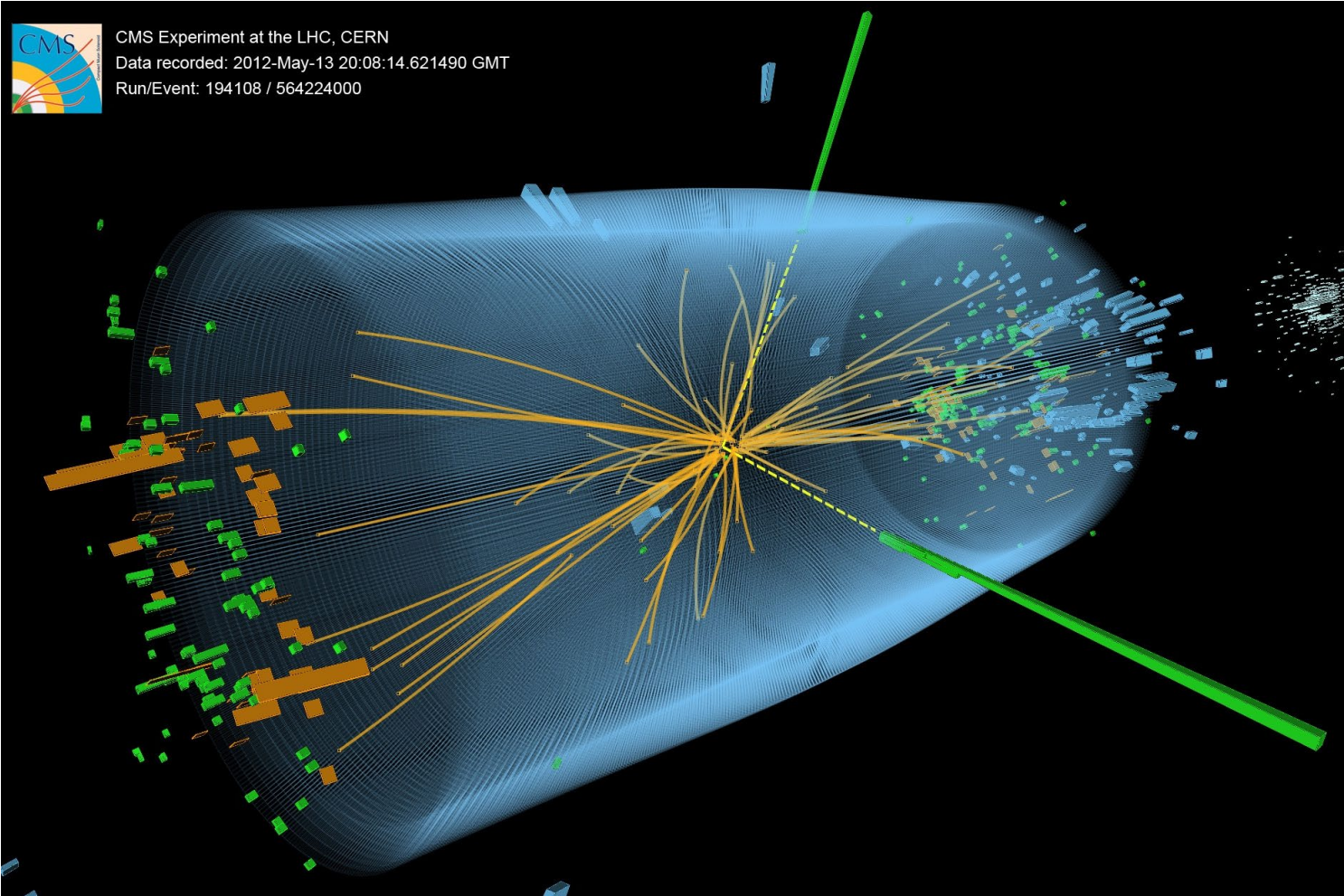
Image via <http://cms.web.cern.ch/news/what-cms>

Tevatron Shutdown



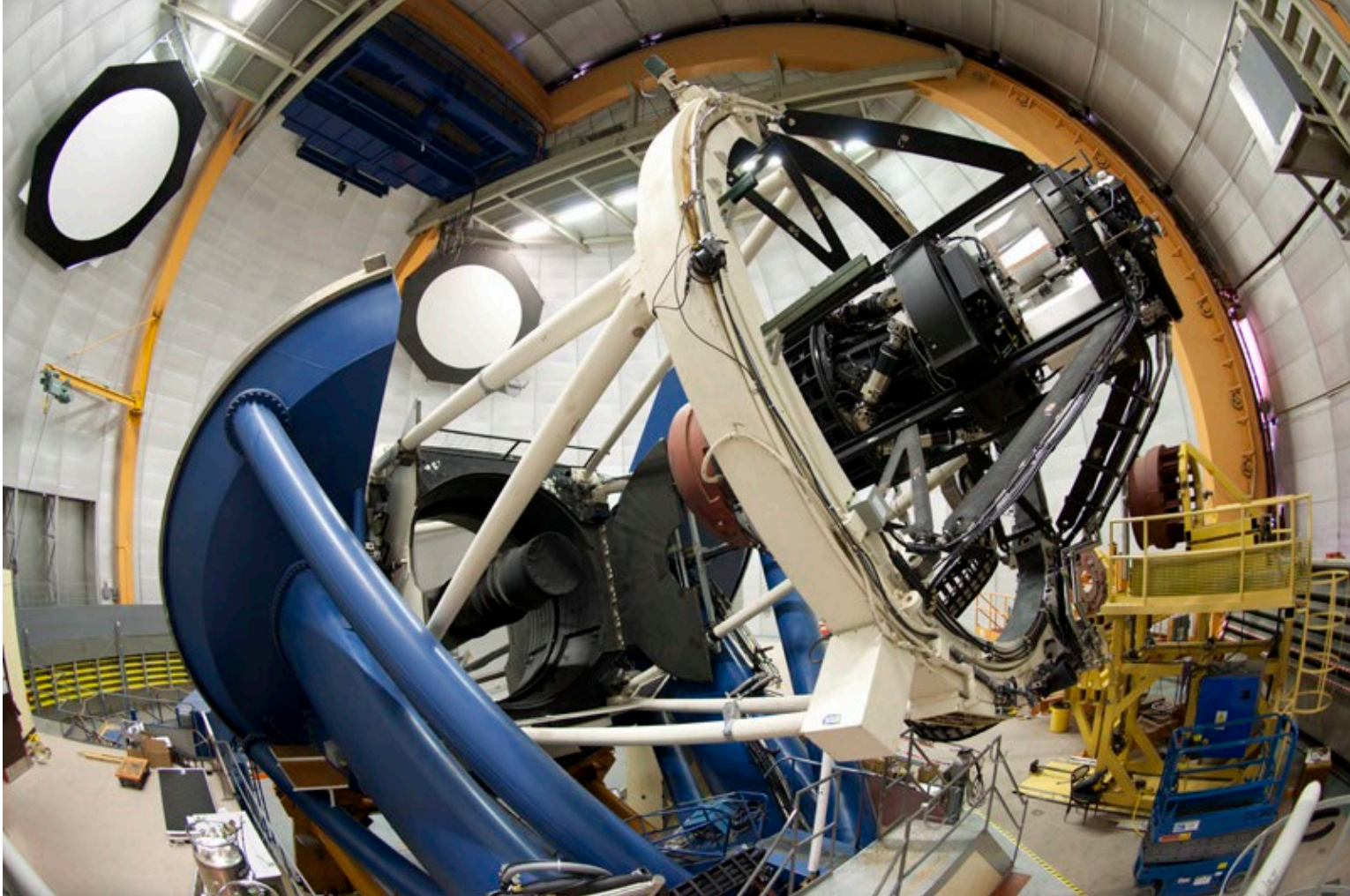
The Tevatron was shut down on September 30, 2011

Higgs Boson Discovery



Announced July 4, 2012

Dark Energy Survey



First pictures in 2012

Dark Energy Survey



First pictures in 2012

Nigel Lockyer Becomes Director



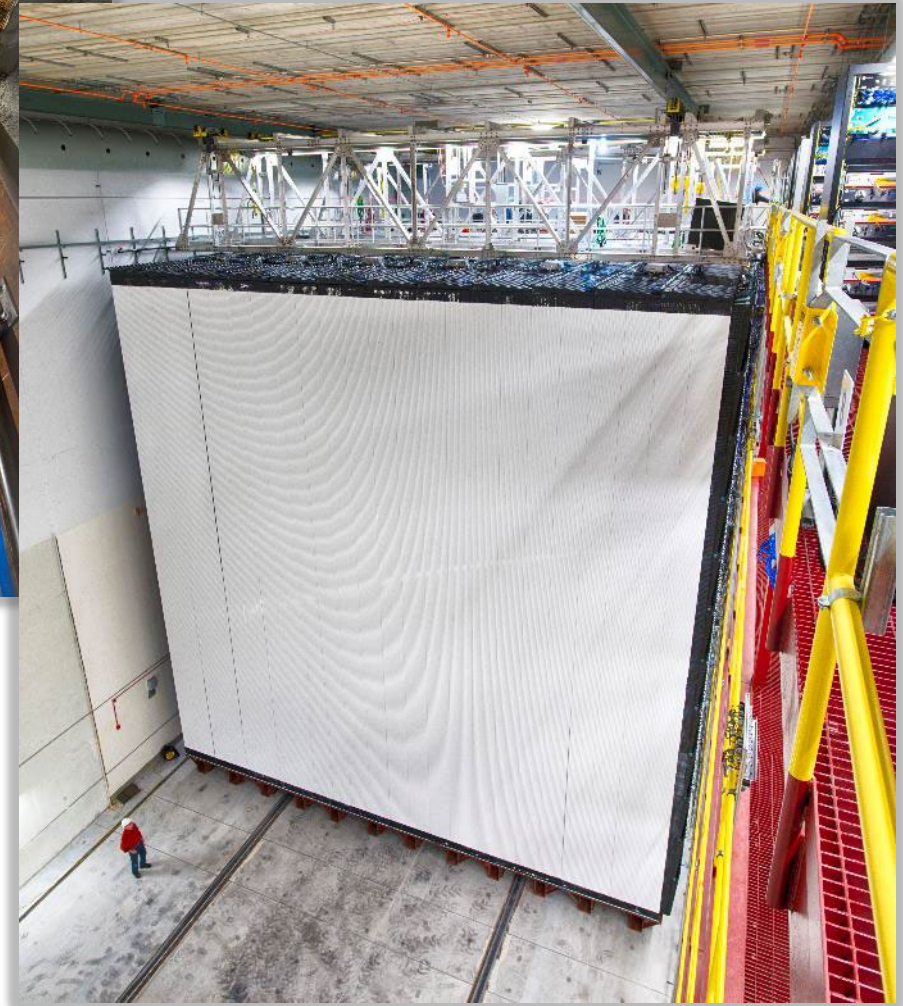
He served as director from 2013 to 2022

NOvA



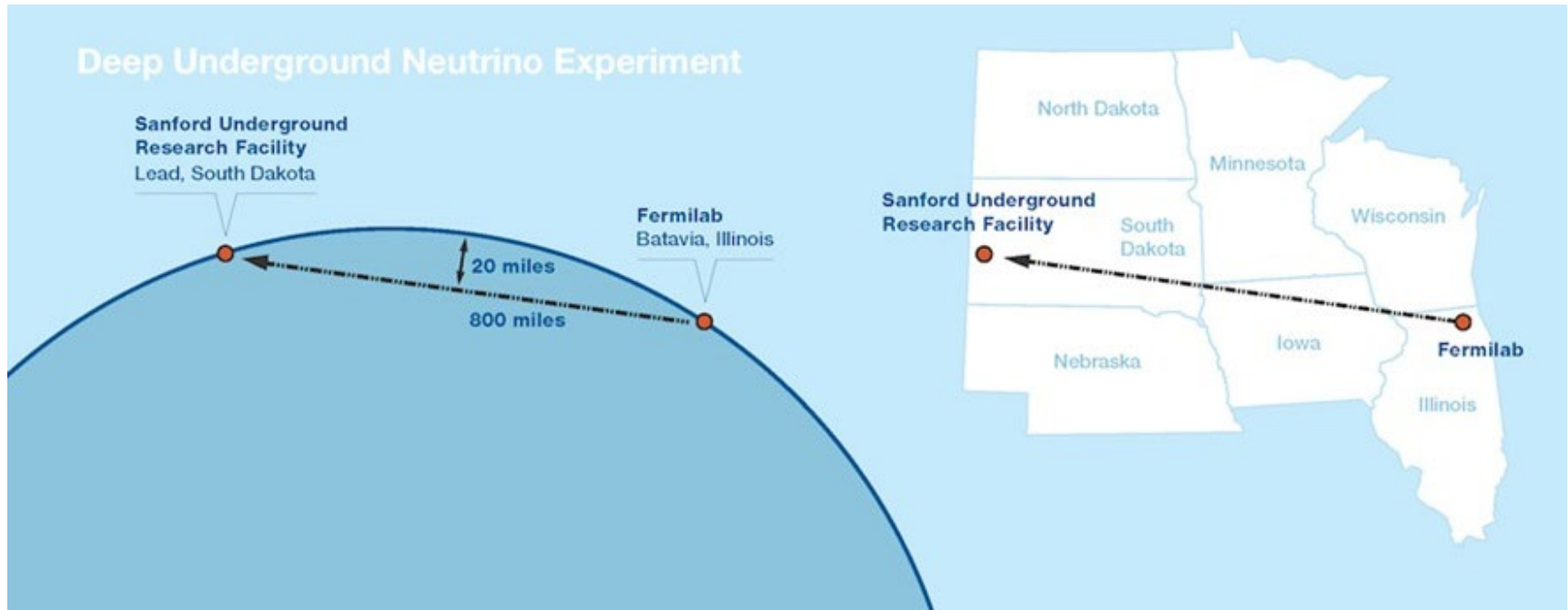
Near Detector

Far Detector



Completed in 2014

LBNF/DUNE



LBNF/DUNE



Members of the DUNE collaboration (formed in 2015) on May 15, 2018.

LBNF/DUNE



LBNF groundbreaking at SURF on July 21, 2017.

LBNF/DUNE



Celebrating the LBNF groundbreaking on July 21, 2017

PIP-II



PIP-II groundbreaking on March 15, 2019

SQMS



2022 SQMS collaboration meeting

Lia Merminga Becomes Director



She has served as director since 2022

PIP-II



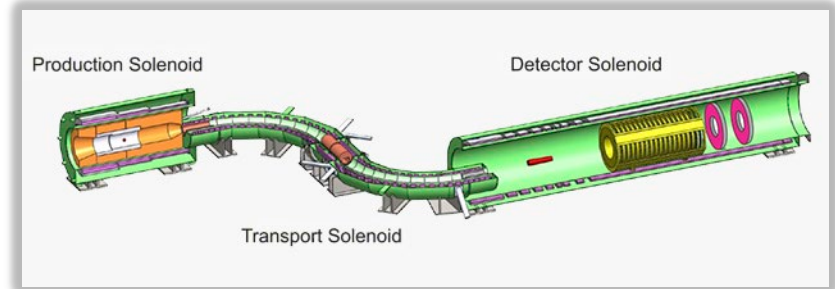
PIP-II in January 2022

Many Other Experiments



Muon g-2

MINERvA



Mu2e



Truly national... and international

Author affiliations on Fermilab papers (based on data in the Inspire database):

1980

- 21 U.S. states/territories
- 11 countries

2010

- 41 U.S. states/territories
- 60 countries

1990

- 28 U.S. states/territories
- 19 countries

2020

- 51 U.S. states/territories
- 77 countries

2000

- 38 U.S. states/territories
- 27 countries

Questions?

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