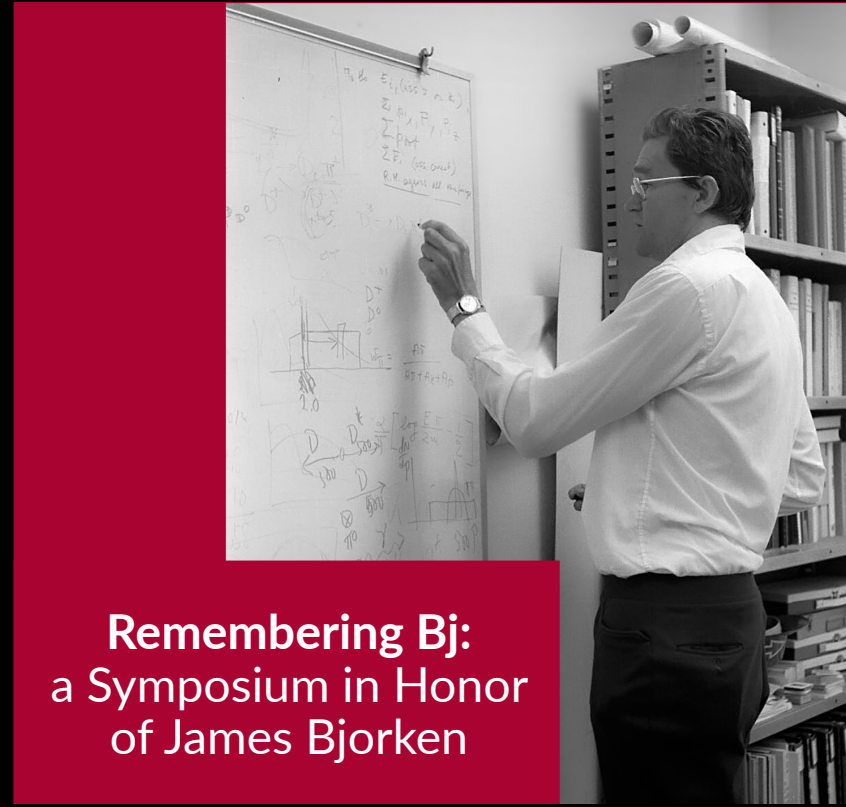


# bj's Fermilab Years

Chris Quigg



**Remembering Bj:**  
a Symposium in Honor  
of James Bjorken



## Prologue: Winter Wonderland

When Leon Lederman took over in 1978, he made a strong effort to woo me away from SLAC. I was entering my midlife-crisis years, which made that option not unattractive for me. But for my wife Joanie, it was a different matter. She was a fifth-generation Californian, with ancestors in the Donner Party. To say the least, she was deeply rooted in the Northern California lifestyle. Undaunted, Leon offered up the director's house for us to live in, and invited us out for a visit. We agreed that we should schedule it at a demanding time of year. This turned out to coincide with the Great Blizzard of 1979. Three feet of fresh snow covered everything. Upon landing at O'Hare, we had to wait for an hour on the tarmac because the way to the gate was not yet plowed. Even North Aurora looked absolutely beautiful. The director's house, needless to say, is a most attractive habitat at any time of year, and it was especially attractive surrounded by all that snow. Joanie was entranced, thinking that this kind of weather happened every year. (Hah!!!)

“Site 29,” in *Fermilab at 50*.







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## Petite unification of quarks and leptons

P. Q. Hung,\* A. J. Buras, and J. D. Bjorken

*Fermi National Accelerator Laboratory,<sup>†</sup> P. O. Box 500, Batavia, Illinois 60510*

(Received 22 June 1981)

A general discussion of a quark-lepton unification characterized by the gauge group  $G_S \otimes G_W$  with two coupling constants  $g_S$  and  $g_W$  and by the unification mass scale  $M = 10^{5 \pm 1}$  GeV is presented. The choice of  $G_W$  is quite restricted by the measured value of  $\sin^2 \theta_W$ . The minimal model of such a unification turns out to be  $SU(4)_{PS} \otimes SU(2)_L \otimes SU(2)_R \otimes SU(2)_{L'} \otimes SU(2)_{R'}$ , where the first three factors constitute the well-known Pati-Salam group. The presence of  $SU(2)_{L'} \otimes SU(2)_{R'}$  is required by the measured value of  $\sin^2 \theta_W$  and it implies the existence of mirror fermions whose masses may range from 20–30 GeV to a few TeV. The lightest mirror fermion might be relatively long lived when compared to an ordinary sequential heavy fermion. The model accommodating all known quark and lepton generations gives the correct  $\sin^2 \theta_W \approx 0.22$  and at the same time can be made consistent with the experimental bounds on rare transitions induced by lepto-quark exchanges.



## TOPICS IN B-PHYSICS (1989)

James D. Bjorken

Fermi National Accelerator Laboratory  
Batavia, Illinois, USA

We discuss a few issues in the burgeoning field of physics of hadrons containing the b-quark. These include:

- 1) A simple parametrization of the Kobayashi-Maskawa matrix featuring a triangle in the complex plane,
- 2) a review of  $B_s$  and  $B_d$  mixing with special attention given to width-mixing and the CP-violating same-sign dilepton asymmetry,
- 3) a discussion of the CP-violating decay  $B_d \rightarrow \psi \pi^+ \pi^-$ ,
- 4) a discussion of CP-violating rate asymmetries in the two-body decays  $\Lambda_b \rightarrow p \pi^-$  and  $\Lambda_b \rightarrow p K^-$ .

The concluding discussion concerns generalizations beyond these specific topics.



# IS THE CCC A NEW DEAL FOR BARYON SPECTROSCOPY?

J. D. Bjorken

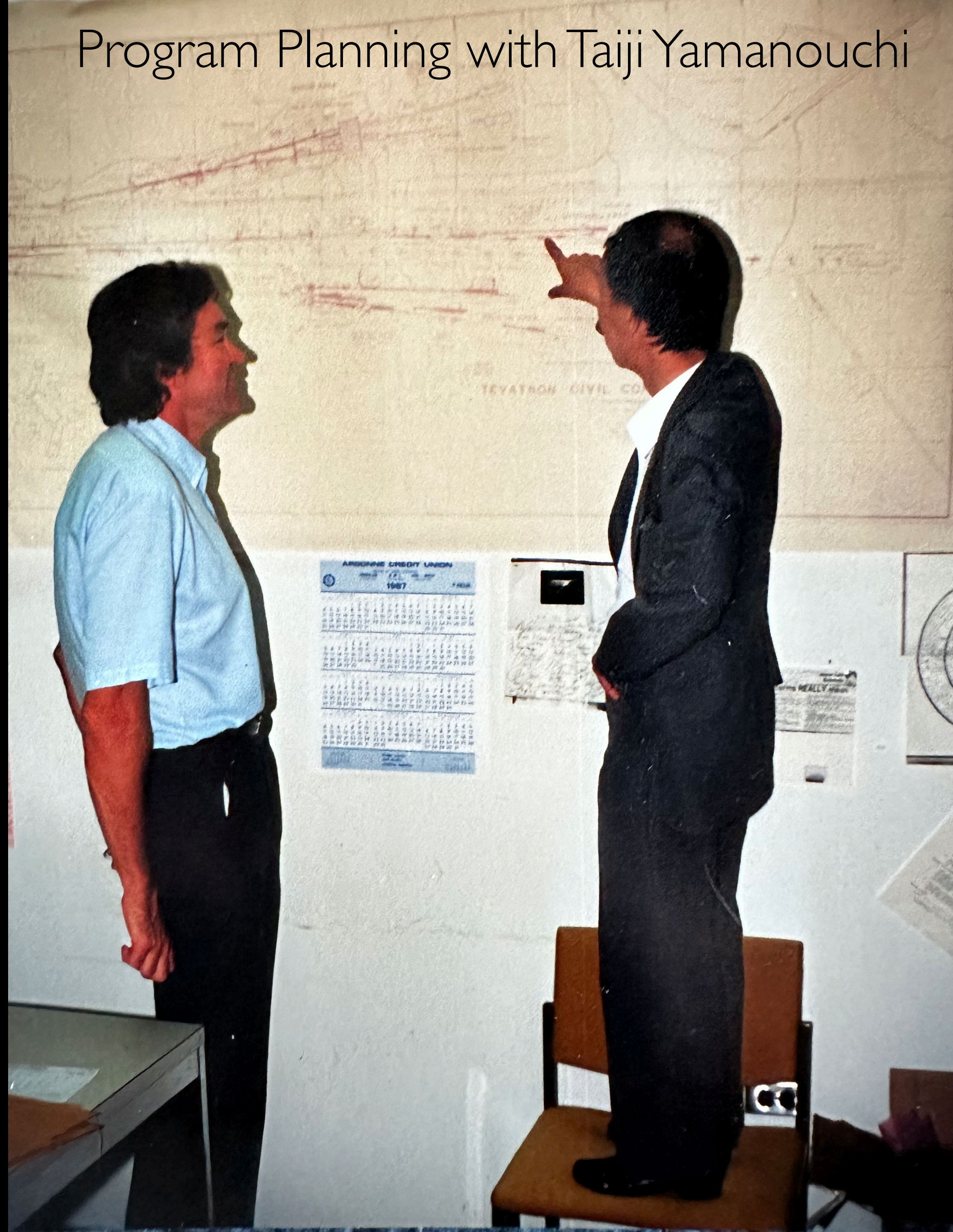
Fermi National Accelerator Laboratory, Batavia, IL 60510

## ABSTRACT

The possibility of experimental observation of the triply charmed ccc baryon  $\Omega_{ccc}^{++}$  is explored. The conclusion is that it is very difficult, but not unthinkable.



# Program Planning with Taiji Yamanouchi





# Fantasies of future Fermilab facilities

R. R. Wilson Rev. Mod. Phys. 51, 259 – Published 1 April 1979

Fermi National Accelerator Laboratory, Batavia, Illinois 60510

The author presents a perspective on possible future projects at Fermilab.

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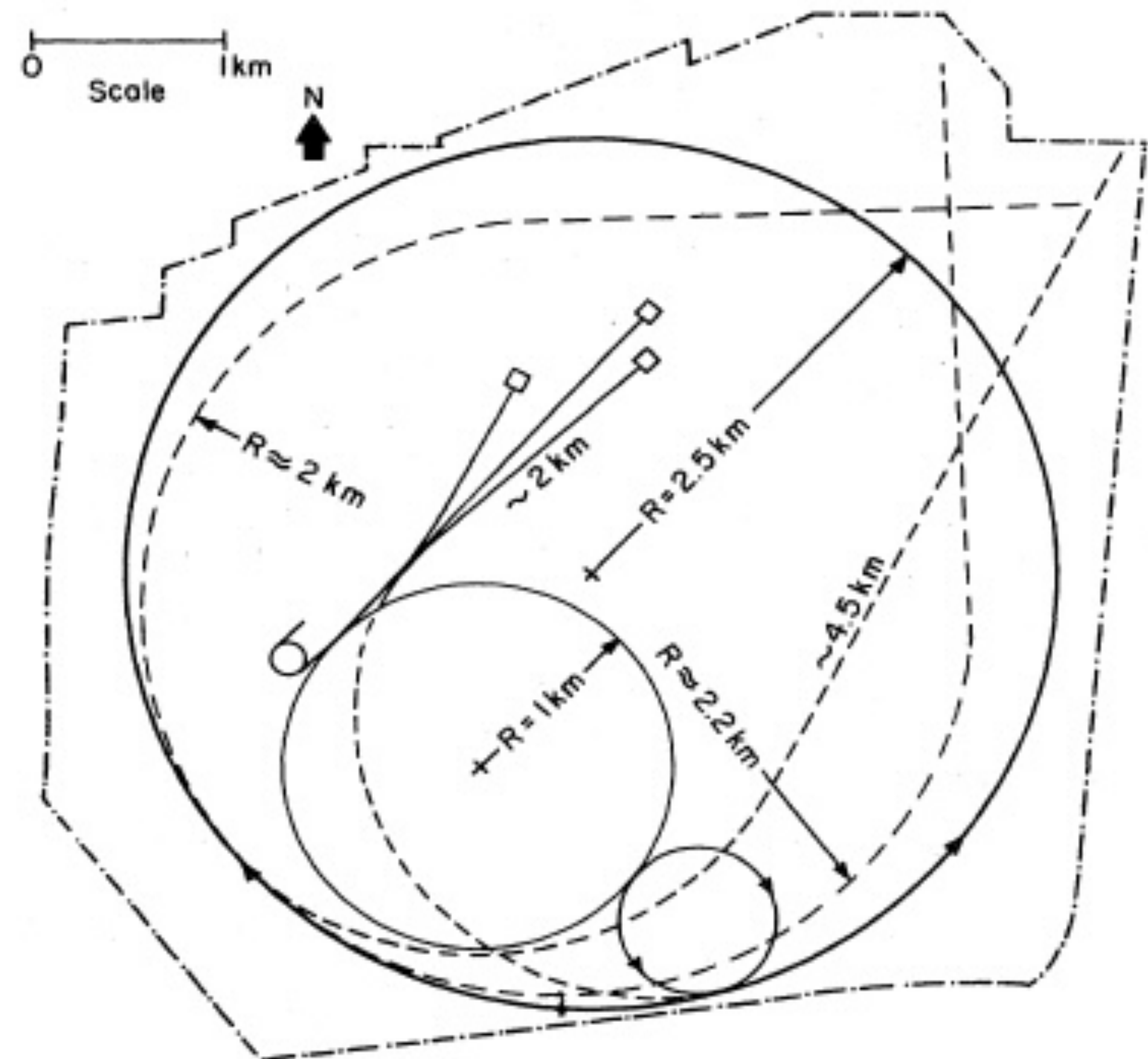


FIG. 11. The Fermilab site with a ring 2.5 km in radius inscribed and with possible external beam lines indicated.

*Oh, fancie that might be, oh, facts that are!*

(Browning, 1889)



# PROPOSAL FOR A DEDICATED COLLIDER AT THE FERMI NATIONAL ACCELERATOR LABORATORY

MAY, 1983

$$\bar{p}p : r = 2 \text{ km}; \sqrt{s} > 4 \text{ TeV}; \mathcal{L} > 10^{31} \text{ cm}^{-2}\text{s}^{-1}$$

Operated by the Universities Research Association, Inc.  
under contract with the U.S. Department of Energy

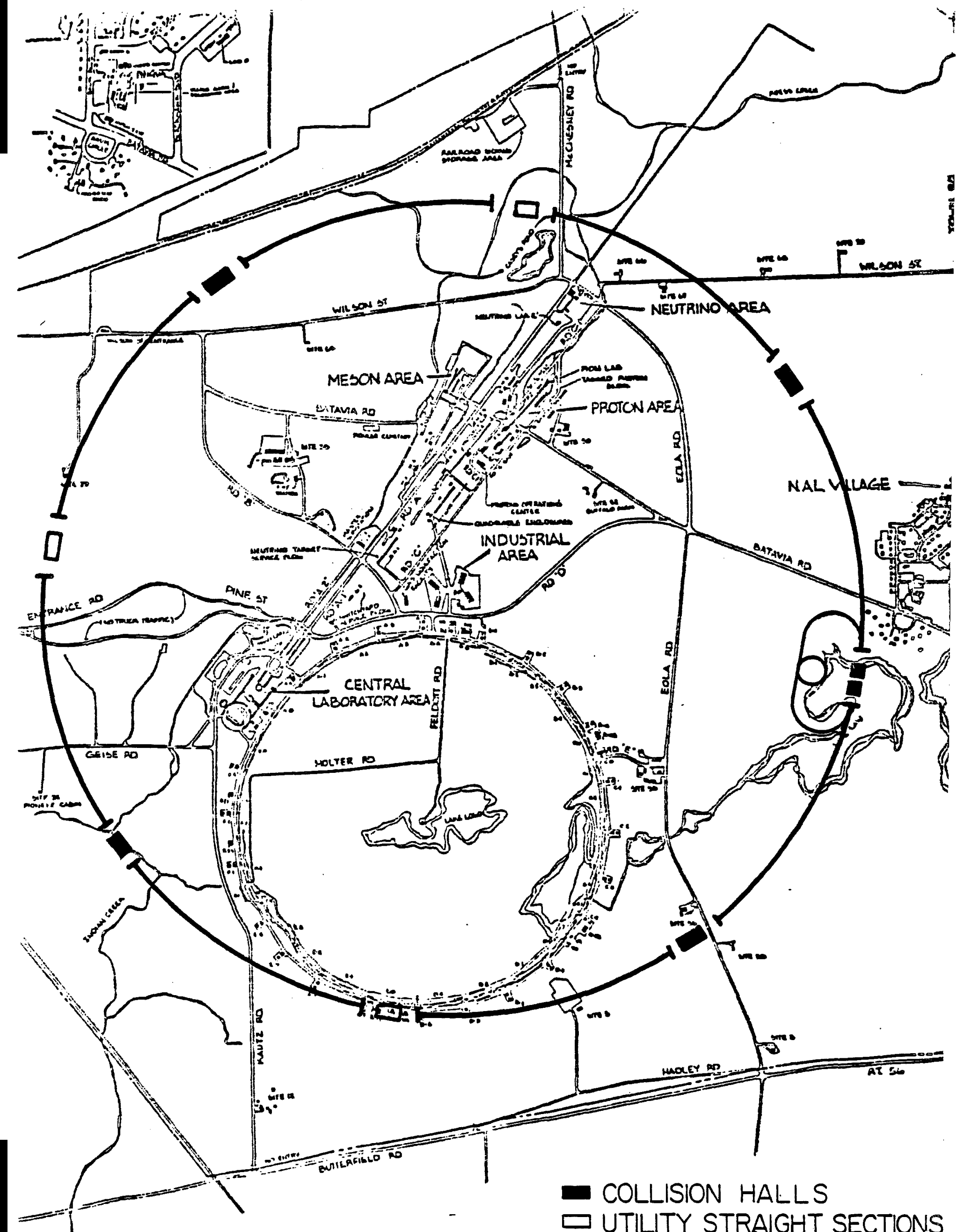


Fig. I-1 Layout of the Dedicated Collider on the Fermilab Site



A THOUSAND TeV IN THE CENTER OF MASS:

INTRODUCTION TO HIGH ENERGY STORAGE RINGS<sup>†</sup>

J.D. Bjorken

Fermi National Accelerator Laboratory  
P.O. Box 500  
Batavia, Illinois 60510

I. INTRODUCTION

These lectures must begin with an apology. Normally at schools such as this, one expects the lecturer to be an acknowledged expert on the subject matter he is discussing. Here this is not the case. Design of high energy proton storage rings is not exactly my forte. Why am I doing this? There are several reasons, short of mental illness.\*

1. I want to learn this subject myself and there is no better way than trying to teach it. And Ferbel didn't stop me.

2. There needs to be a broader knowledge of accelerator physics in the elementary-particle community. Experimentalists at the storage rings find themselves especially closely coupled to their machine and its operation. And theorists can find interesting and challenging questions which lie at the frontier of the very active field of nonlinear mechanics.

3. Straightforward extrapolation of existing acceleration techniques would seem to lead to very large, expensive machines. While we may envision one, perhaps two generations of future accelerators using essentially existing techniques, the question of how to go beyond that is a difficult one. There seems to be a growing feeling that it is not too soon to start to face up to the problem. A look at the alternative--as we do here--can only provide stimulation.

\*See Appendix II.

<sup>†</sup>Lectures given at the 1982 NATO Advanced Study Institute, Lake George, N. Y., June 1982.



# Aspen Program Advisory Committee Meeting (1983)





*Euphoria: Tevatron Operates at 512 GeV (1983)*





bj, Opera Lover



Jeannie Fisk, Carl Albright, bj, Gene Fisk (Lyric Opera, Chicago)



by the Outdoorsman





## Legendary New Year's Eve Parties at Site 29

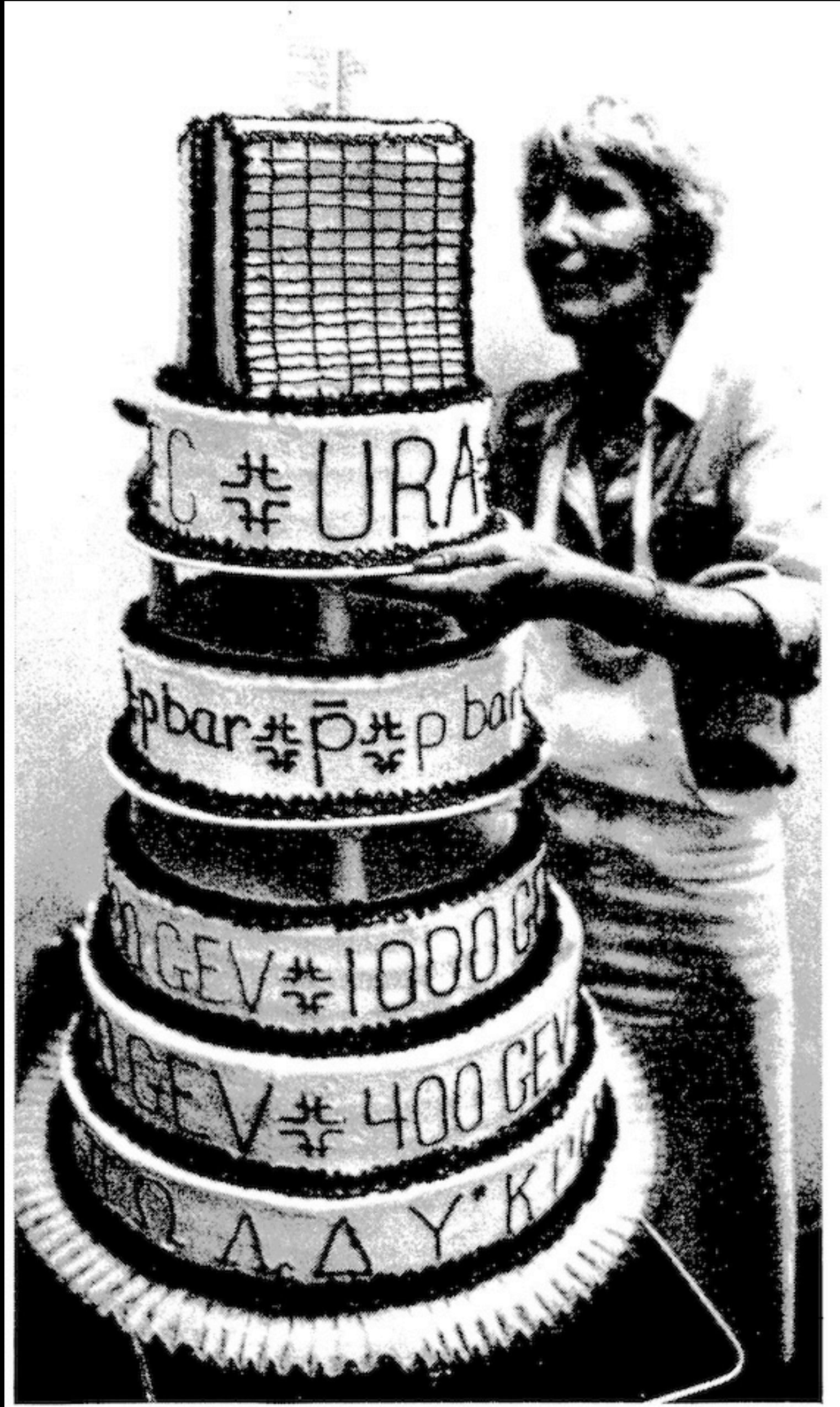
Site 29 became a focal point for a variety of lab occasions. One of these was our annual New Year's Eve party. At SLAC, we were annual attendees of the party held by SLAC experimentalist and Scotsman David Leith, which was big. So, we endeavored to copy it and ended up with a party even bigger, open to a large number of Fermilab people. The first year of this party was especially memorable. The large family room in the basement was opened up as a dance floor. Unfortunately, the toilets down there were not used to that kind of thing and overflowed, leaving the basement something of a lake.

In hindsight, we were rather fortunate in hosting those parties. They occurred before the age of the designated driver, and our “artillery punch” — hard liquor diluted with red wine and strong tea — not infrequently did in some number of our guests. One time this even included a few of the lab security people assigned to park cars.

“Site 29,” in *Fermilab at 50*.



Joan G. Bjorken (1936–1983)







We do physics because it is fun!

Every unit of rapidity merits an equal investment.

If it is useful (or might be), it is not beneath your dignity.



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