

June, 1989

Detector Research and Development

Kirk McDonald, *Princeton University*

- Physics Goal: Study of CP Violation in B-meson decay at a hadron collider
 - $\sigma_{B\bar{B}} \sim 10^6$ larger at the SSC than at e^+e^-
 - Produce 10^{12} $B\bar{B}$ pairs in 1 year of 10^{32} luminosity at the SSC
 - Exciting challenge to build a detector to do this physics
- Collaboration forming to build the BCD (Bottom Collider Detector)
 - Oct 1988: Letter of Intent to Fermilab TEV I
 - May 1990: Letter of Intent to SSC Lab
- R&D Proposal to Fermilab, Jan. 2, 1989
 - This R&D vital for any hadron-collider study of B physics
 - Phase I and II approved by Fermilab PAC, Jan. 30, 1989
 - Phase I (FY 89): Bench tests
 - Phase II (FY 90): Tests in Fermilab fixed-target beam Summer 1990 (next beam in 1992!)
 - Phase III (FY 91) System test in C0 intersect during collider run
 - > Presently under consideration by Fermilab PAC
 - > Next collider run in 1993

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- Princeton Effort
 - Infrared-laser test facility for silicon detectors
 - Computer simulations of silicon vertex detector and straw-tube tracking chamber
 - **Prototype construction of straw-tube tracking chambers**
 - > Build 1000 tubes for Summer 1990; 10,000 for Summer 1991 (250,000 tubes for a collider experiment!)
 - > Develop industrial assembly techniques
 - > \$10k startup funding in FY 89
 - > Seek substantial funding in FY 90 for a significant program in time for the FNAL test-beam run