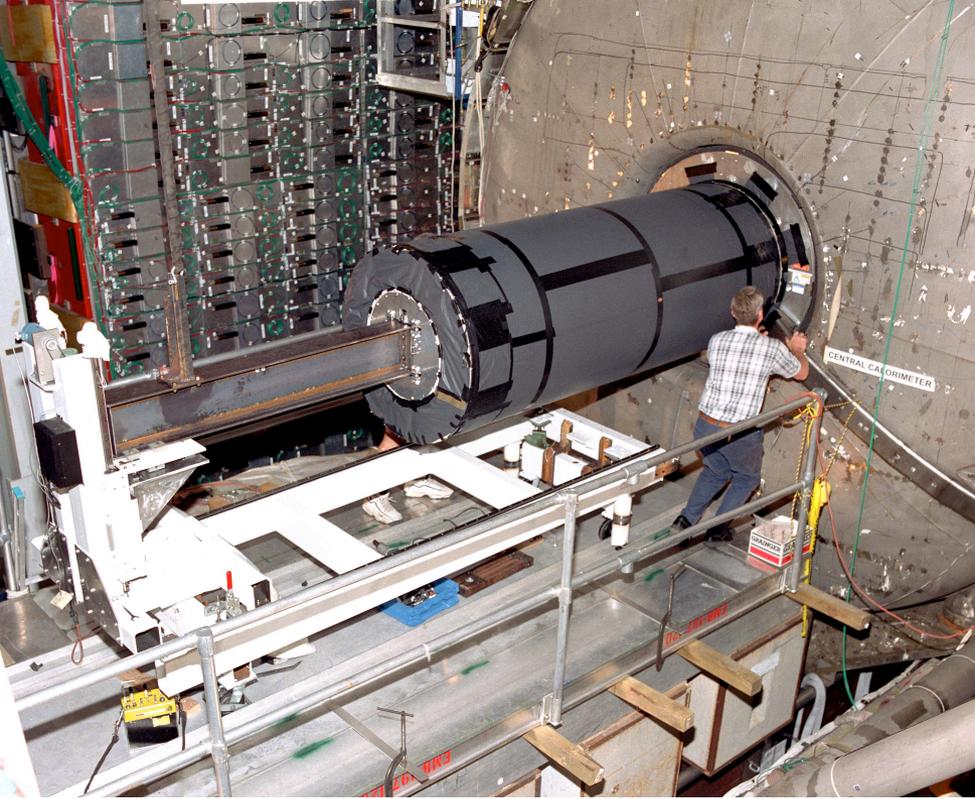


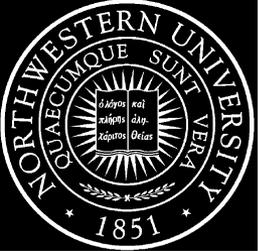
# AN INTRODUCTION TO DØ



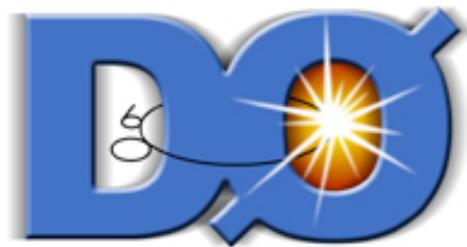
GREGORY A. DAVIS  
NORTHWESTERN UNIVERSITY

SPECIAL PRESENTATION

FERMILAB NEW PERSPECTIVES  
CONFERENCE  
JUNE 10, 2005



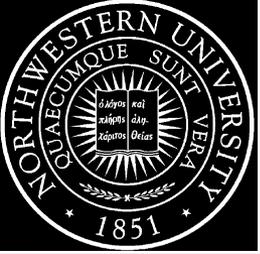
# FERMI NATIONAL ACCELERATOR LABORATORY A.K.A. FERMILAB



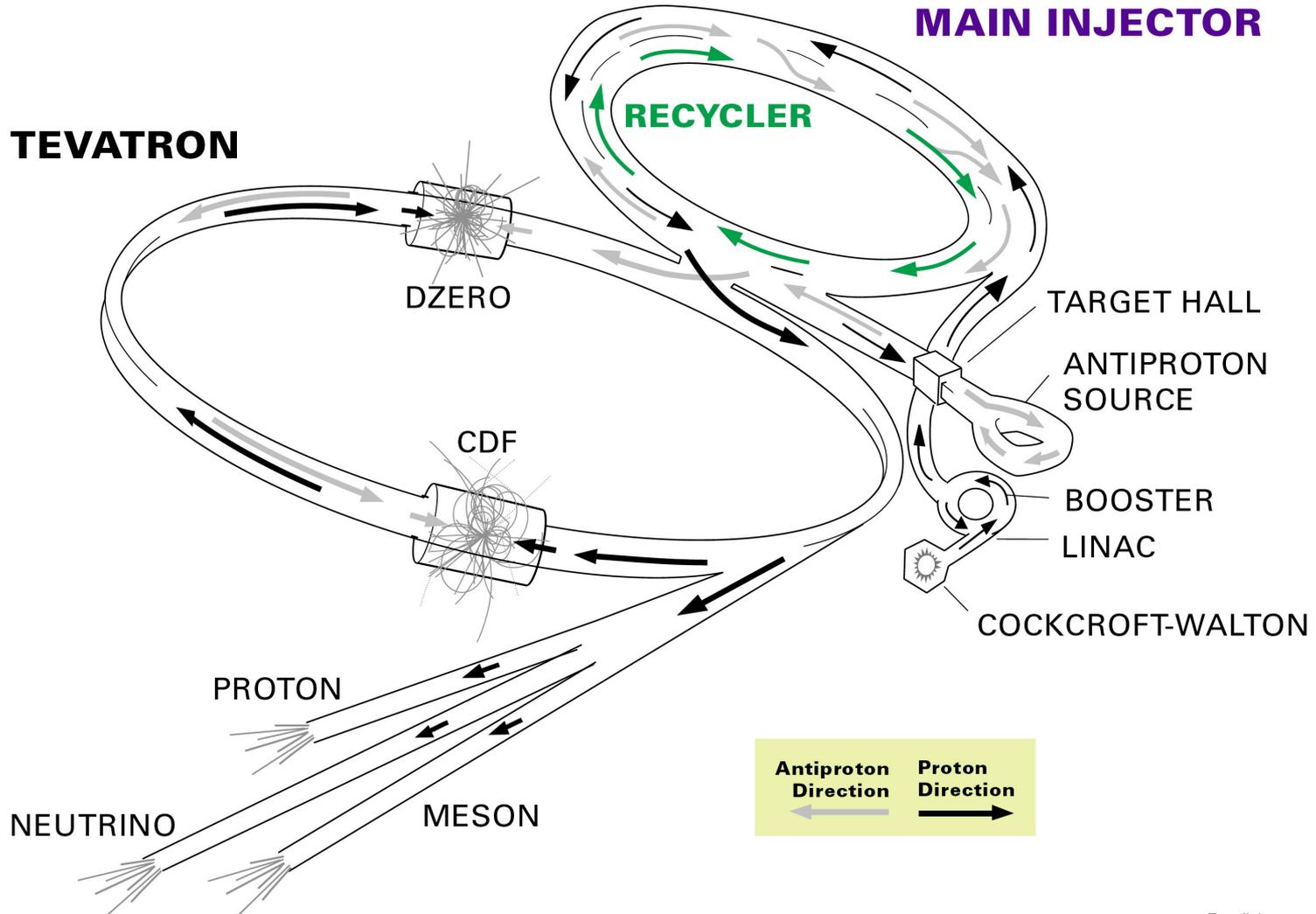
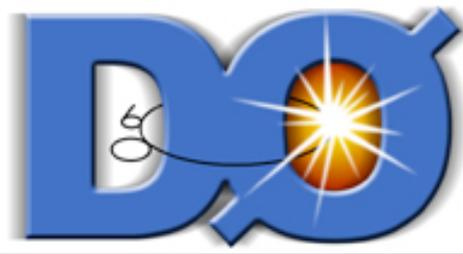
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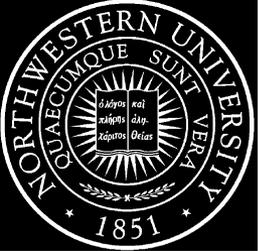
GREGORY A. DAVIS

2

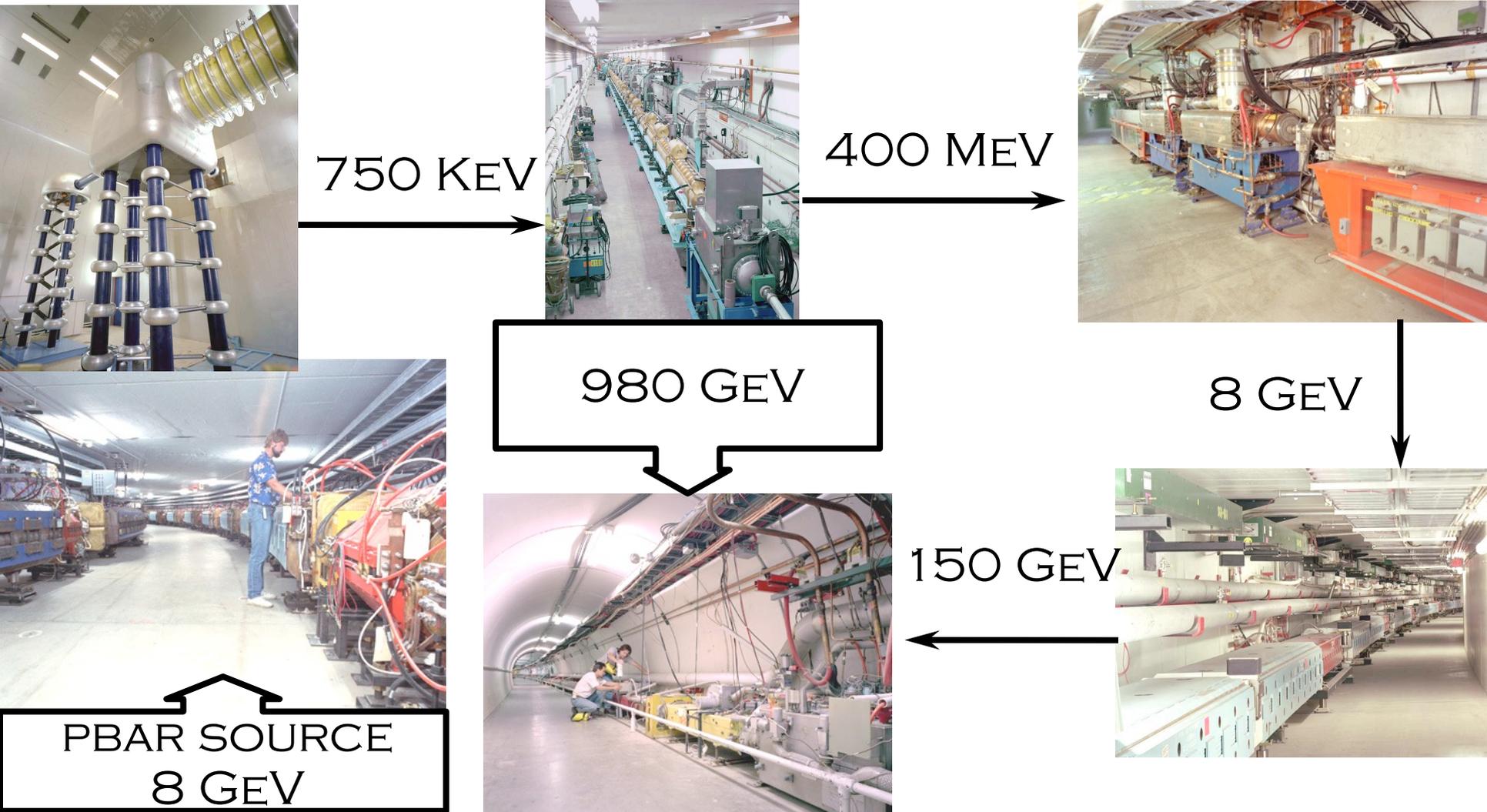
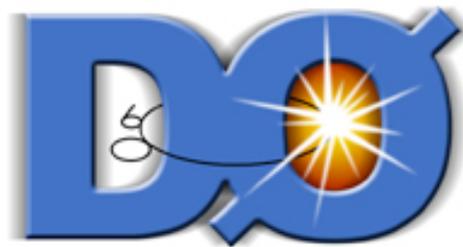


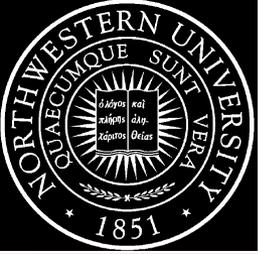
# THE MACHINES



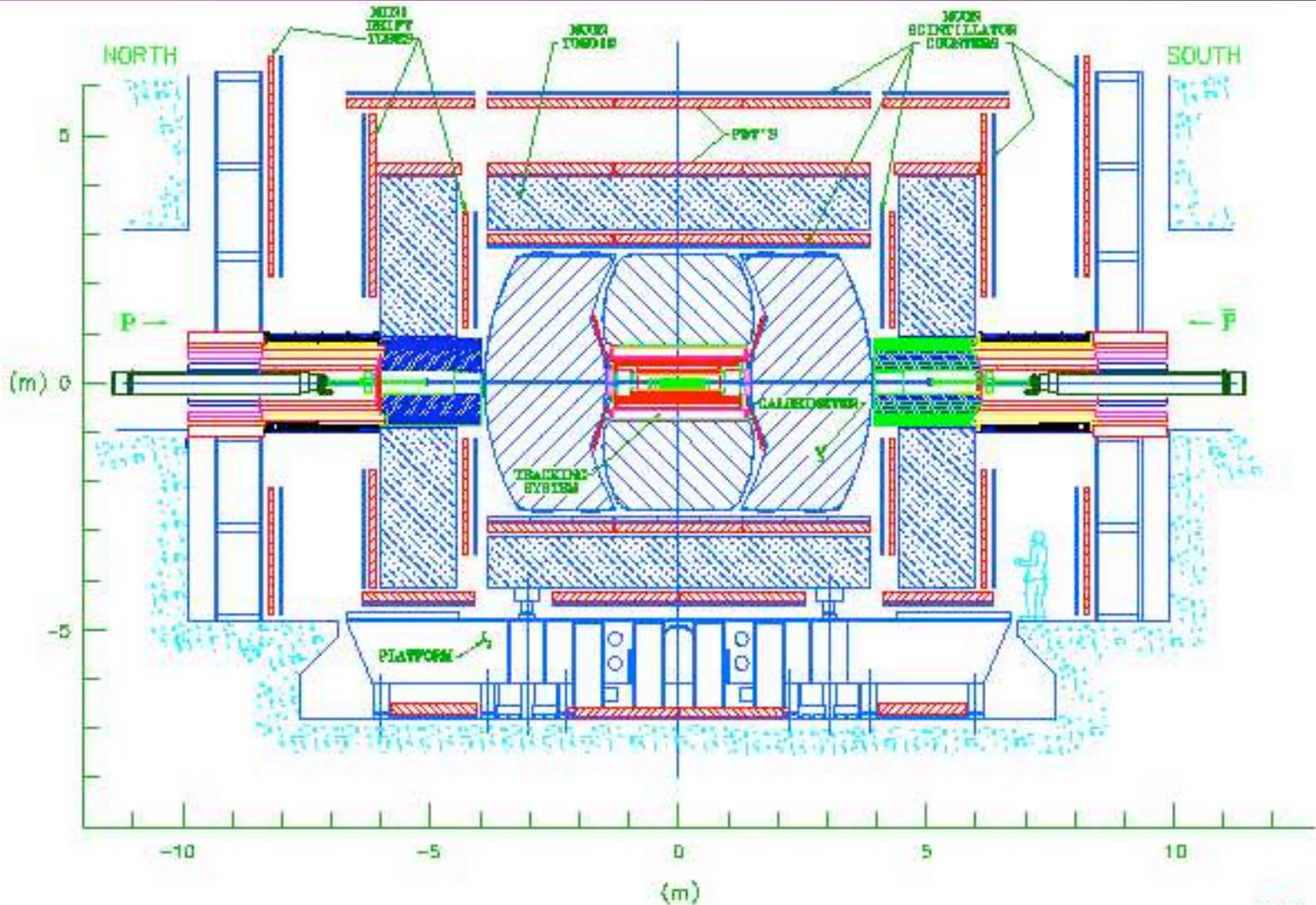
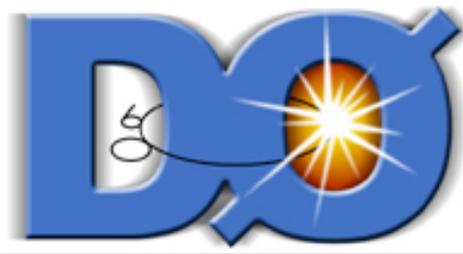


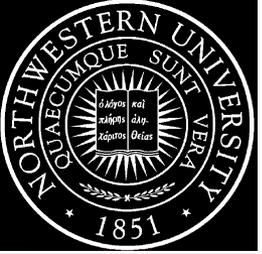
# AN INSIDE LOOK



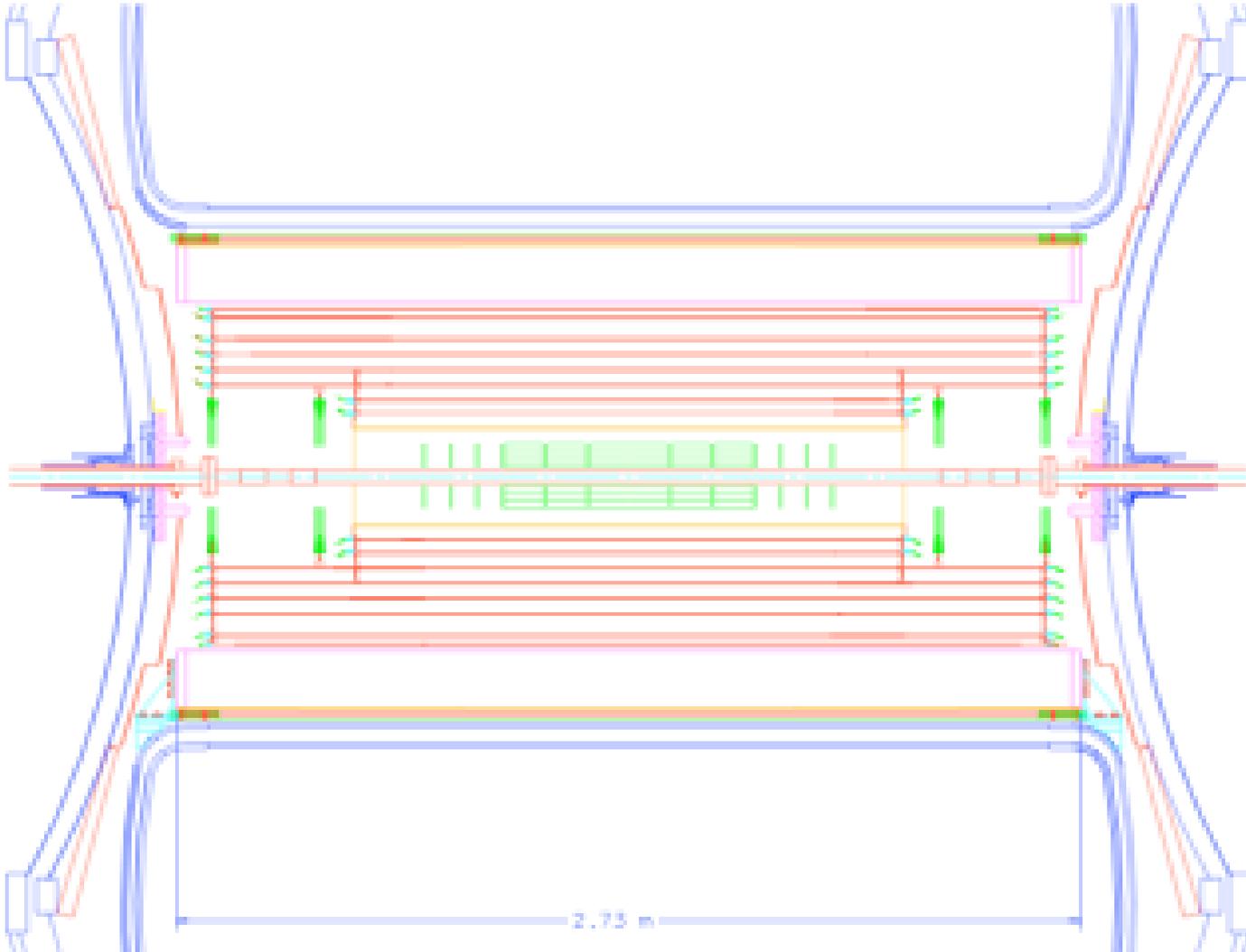
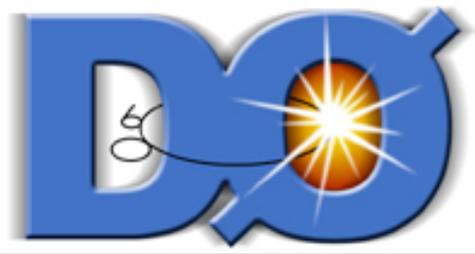


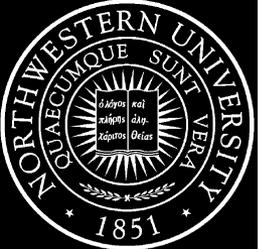
# DØ SCHEMATIC



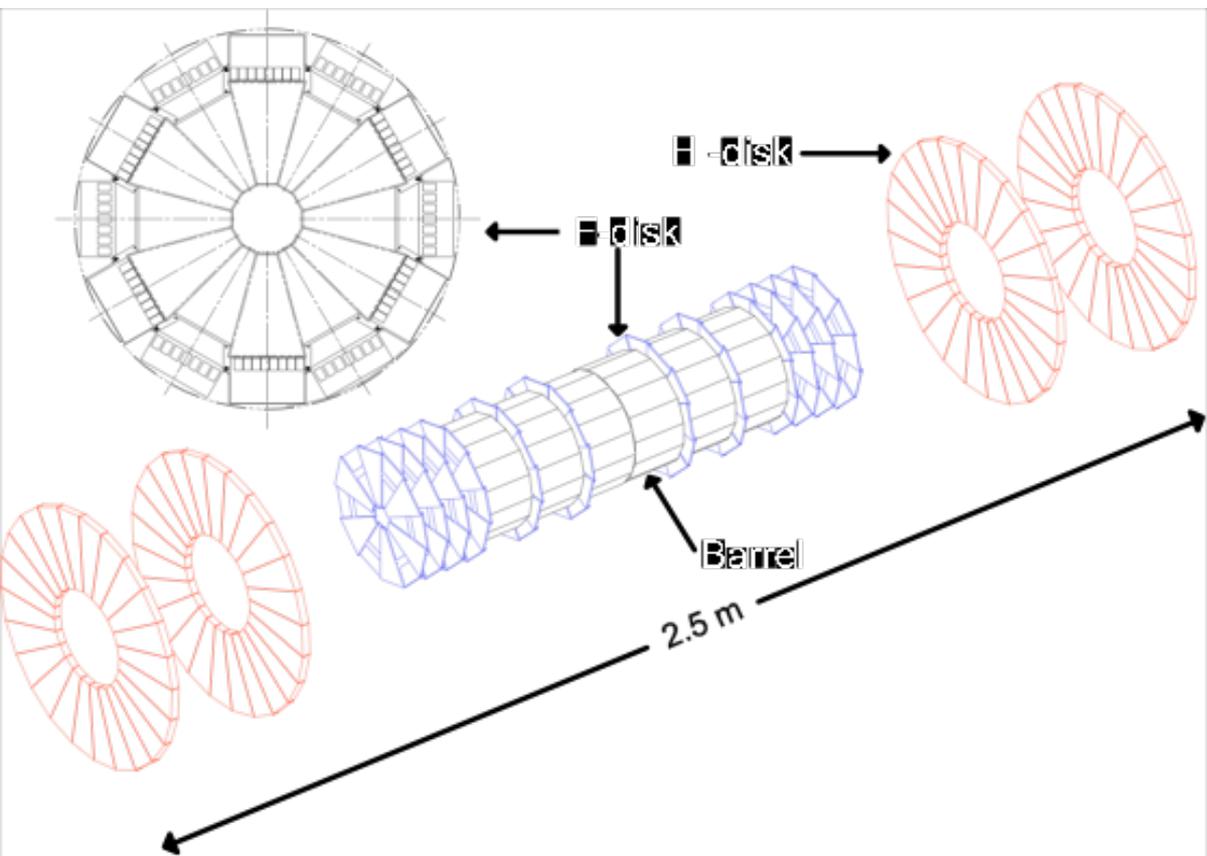
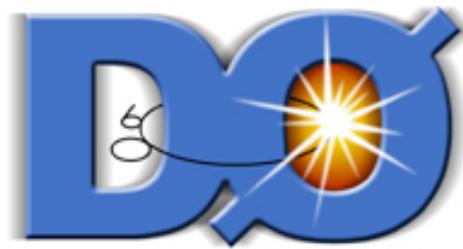


# INSIDE THE BORE

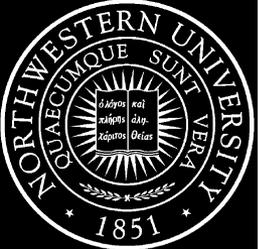




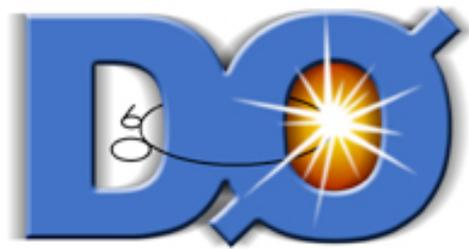
# SILICON MICROSTRIP TRACKER (SMT)



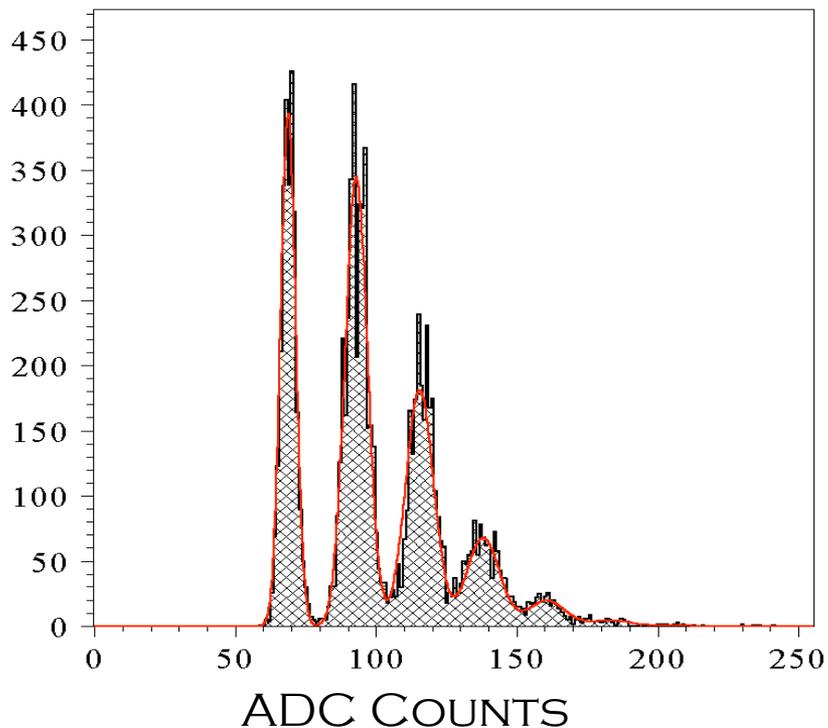
- 800,000 CHANNELS
- PITCH RANGES FROM 50 TO 150  $\mu\text{m}$
- HIT POSITION RESOLUTION  $\sim 10 \mu\text{m}$



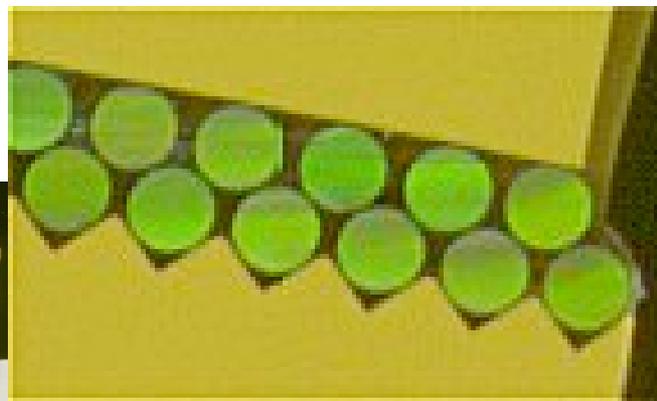
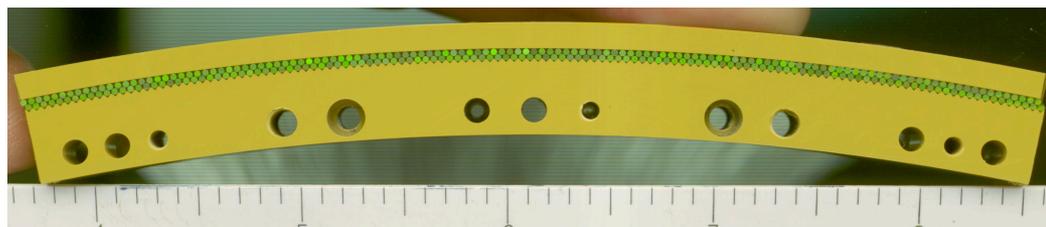
# CENTRAL FIBER TRACKER (CFT)

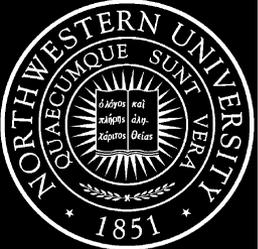


## TYPICAL VLPC SPECTRUM

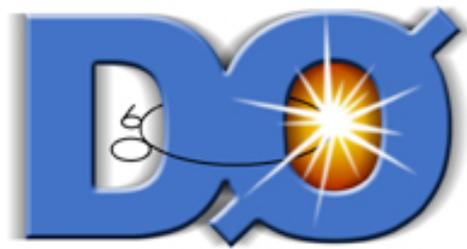


- 80,000 CHANNELS OF SCINTILLATING FIBER
- 16 DOUBLET LAYERS
  - 8 AXIAL
  - 8 2° STEREO



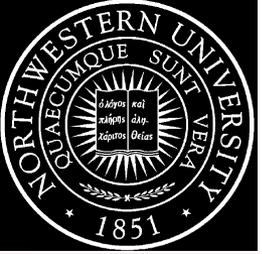


# THE PRESHOWERS (CPS & FPS)

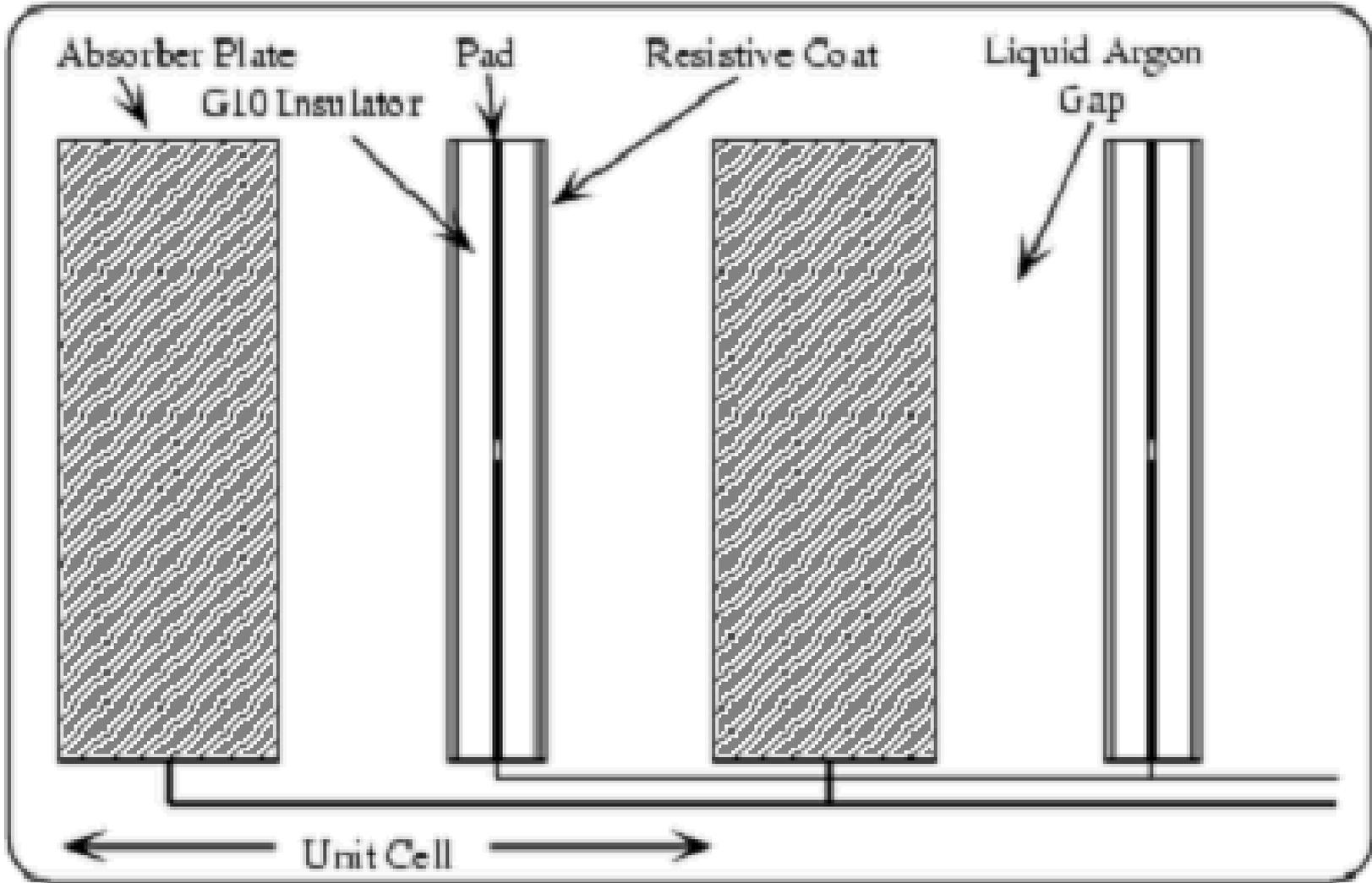
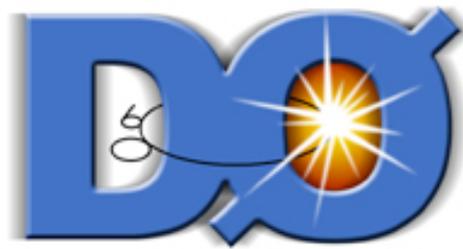


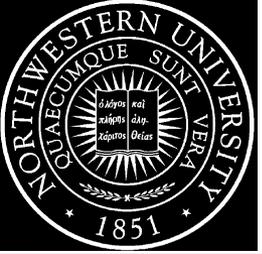
- CPS
  - SITS BEHIND THE SOLENOID
  - 3 LAYERS
- FPS
  - LEAD ABSORBER IN THE MIDDLE
  - 2 UPSTREAM LAYERS
  - 2 DOWNSTREAM LAYERS
- DESIGNED TO AID ELECTROMAGNETIC ENERGY RESOLUTION AND HELP WITH EM ID



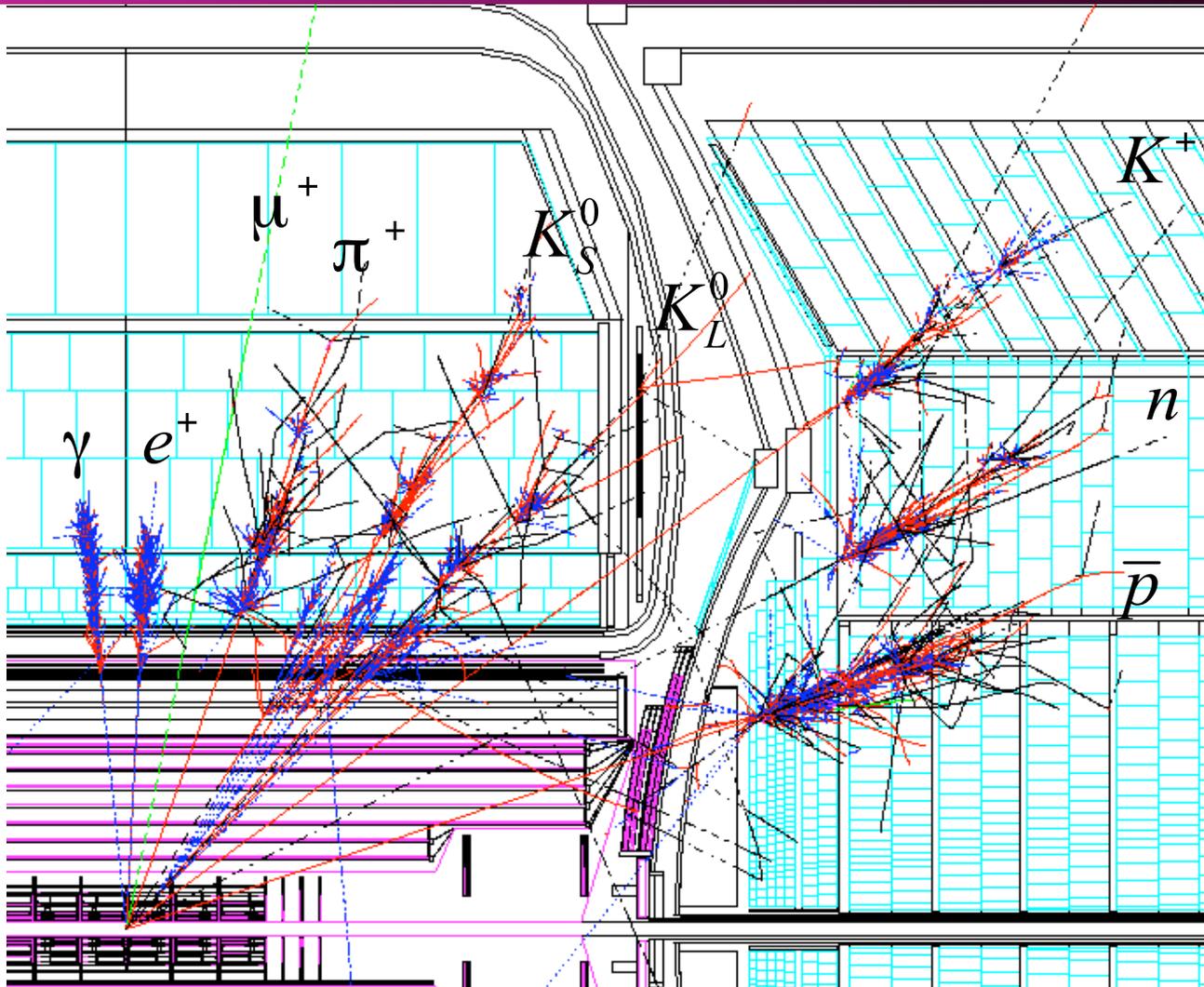
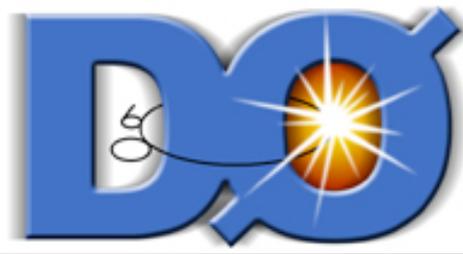


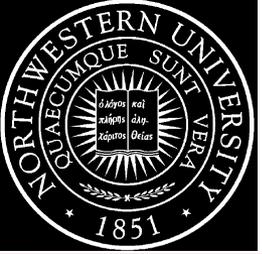
# CALORIMETER CELLS



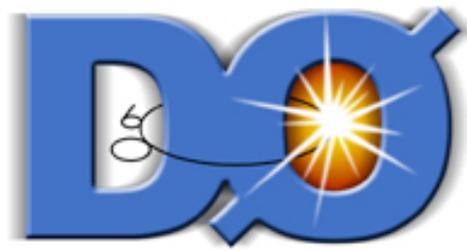


# CALORIMETER SIGNALS

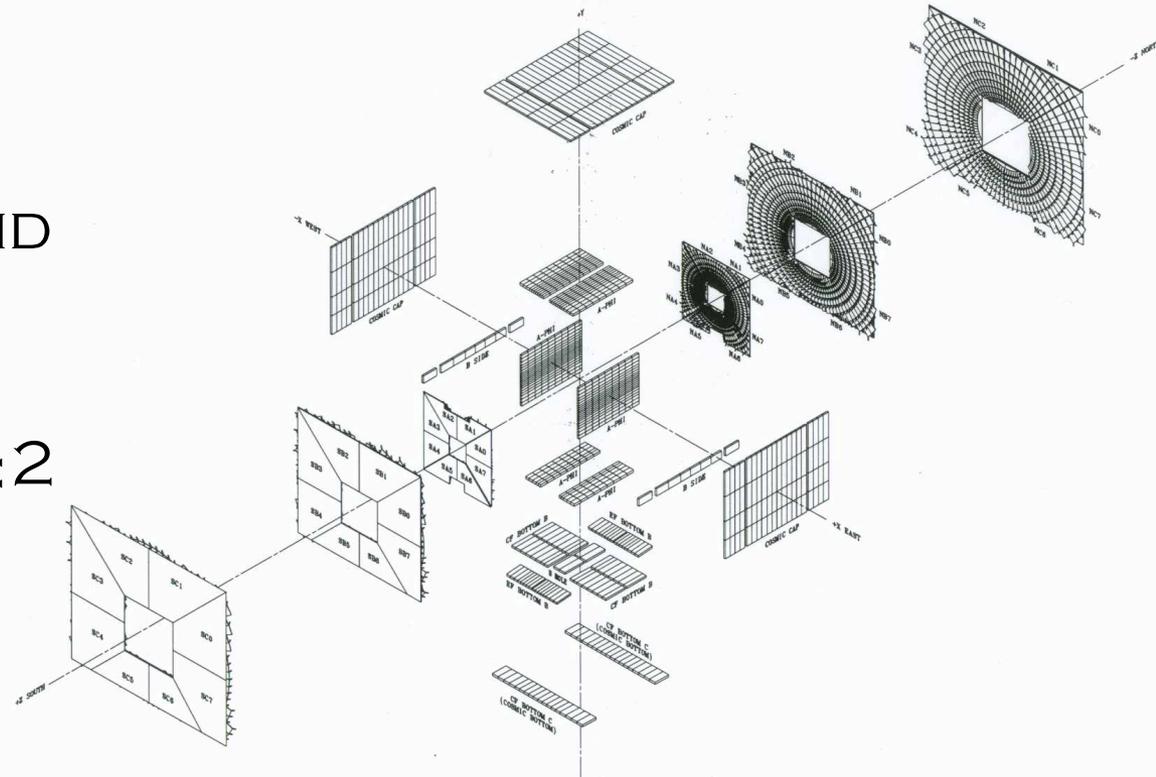
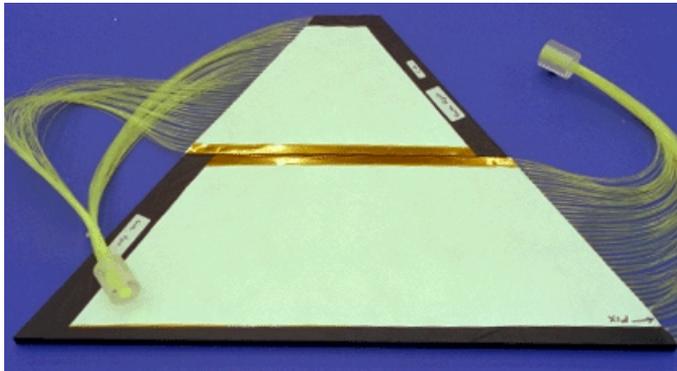


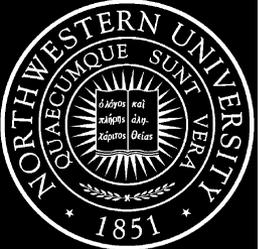


# THE MUON SYSTEM

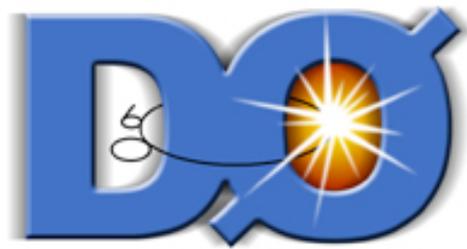


- SCINTILLATOR WEDGES FOR TRIGGERING
- WIRE CHAMBERS FOR PRECISE POSITION MEASUREMENTS
- 3 LAYERS, 1 INSIDE AND 2 OUTSIDE A TOROID MAGNET
- COVERAGE TO PSEUDORAPIDITY OF  $\pm 2$

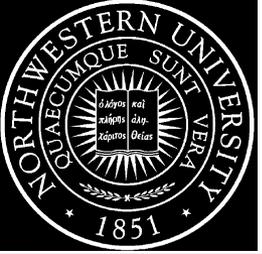




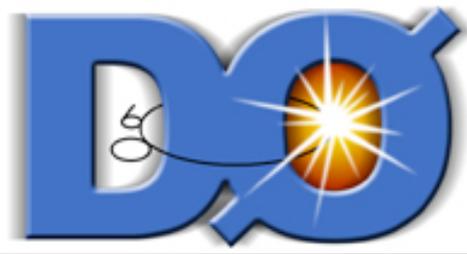
# TRIGGERS



- THE TEVATRON PROVIDES 1.7 MILLION CROSSINGS PER SECOND
- DØ CAN WRITE AND PROCESS ~50 OF THEM
- WE USE A TRIGGER TO DETERMINE WHICH EVENTS TO RECORD
- SOME TRIGGERS ARE PRESCALED TO REDUCE THE NUMBER OF EVENTS
  - IF A TRIGGER HAS A PRESCALE OF 100, IT IS ONLY ACTIVE 1% OF THE TIME
  - PRESCALED TRIGGERS ARE EXPOSED TO LESS LUMINOSITY



# IN CONCLUSION



- DUE TO ANALYSIS DEPENDENCE: NO PERFORMANCE NUMBERS HERE
- $D\emptyset$  IS A GENERAL PURPOSE DETECTOR DESIGNED FOR MANY SORTS OF HIGH  $P_T$  PHYSICS
- FOUR YEARS INTO RUN II, WE HAVE AN EXCITING PROGRAM WITH MANY GREAT RESULTS