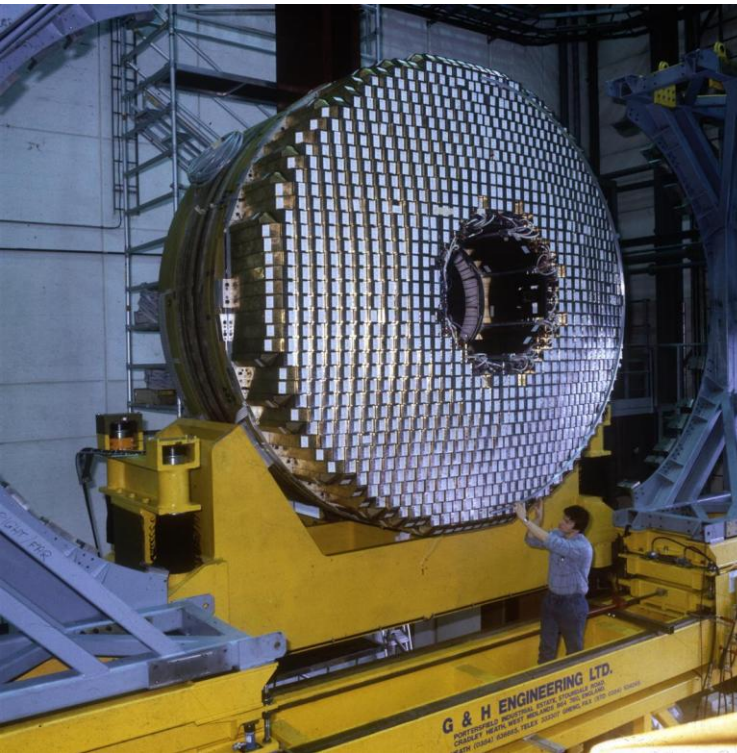
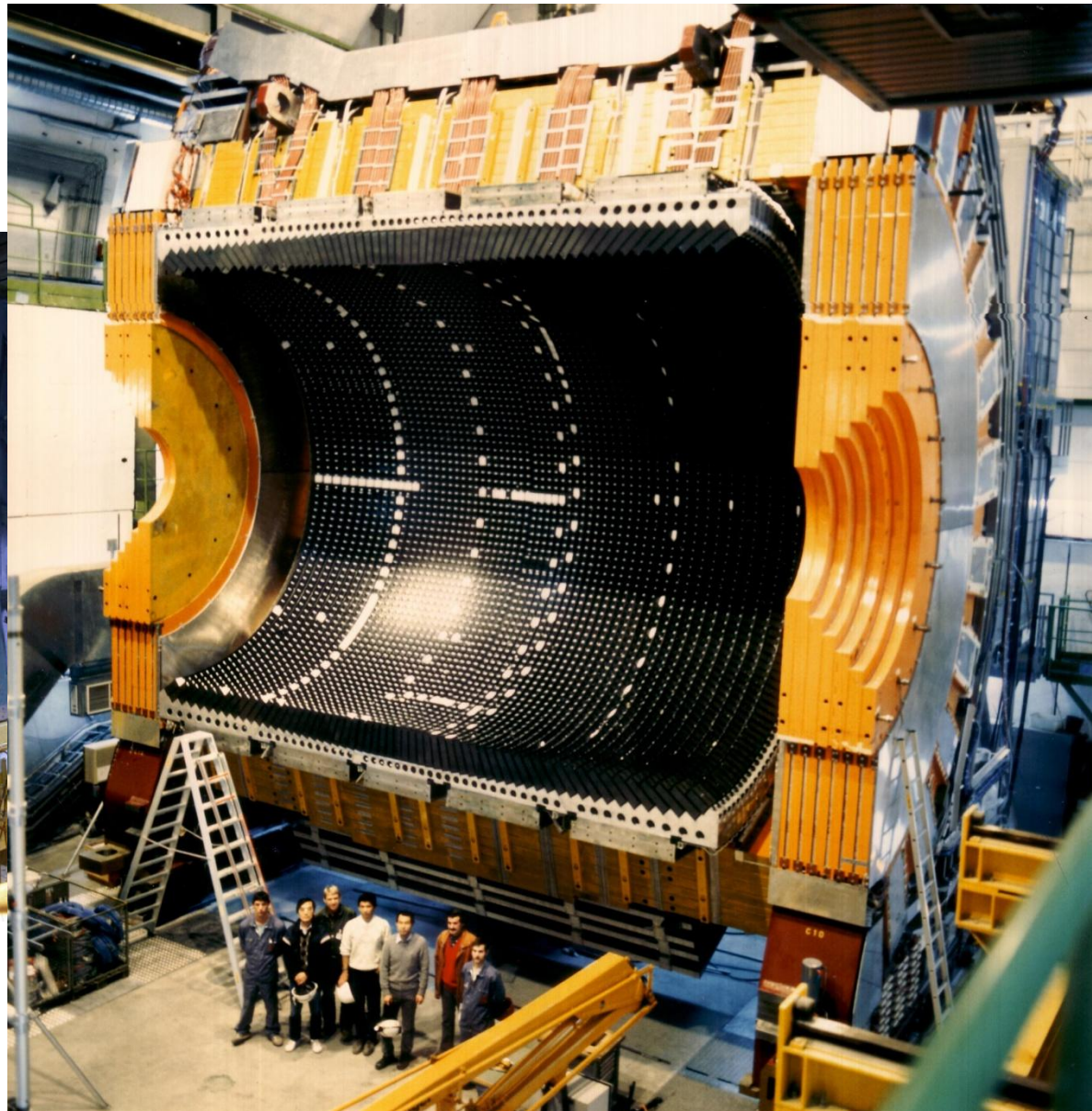


# OPAL Experiment Seen from Lead Glass Counters

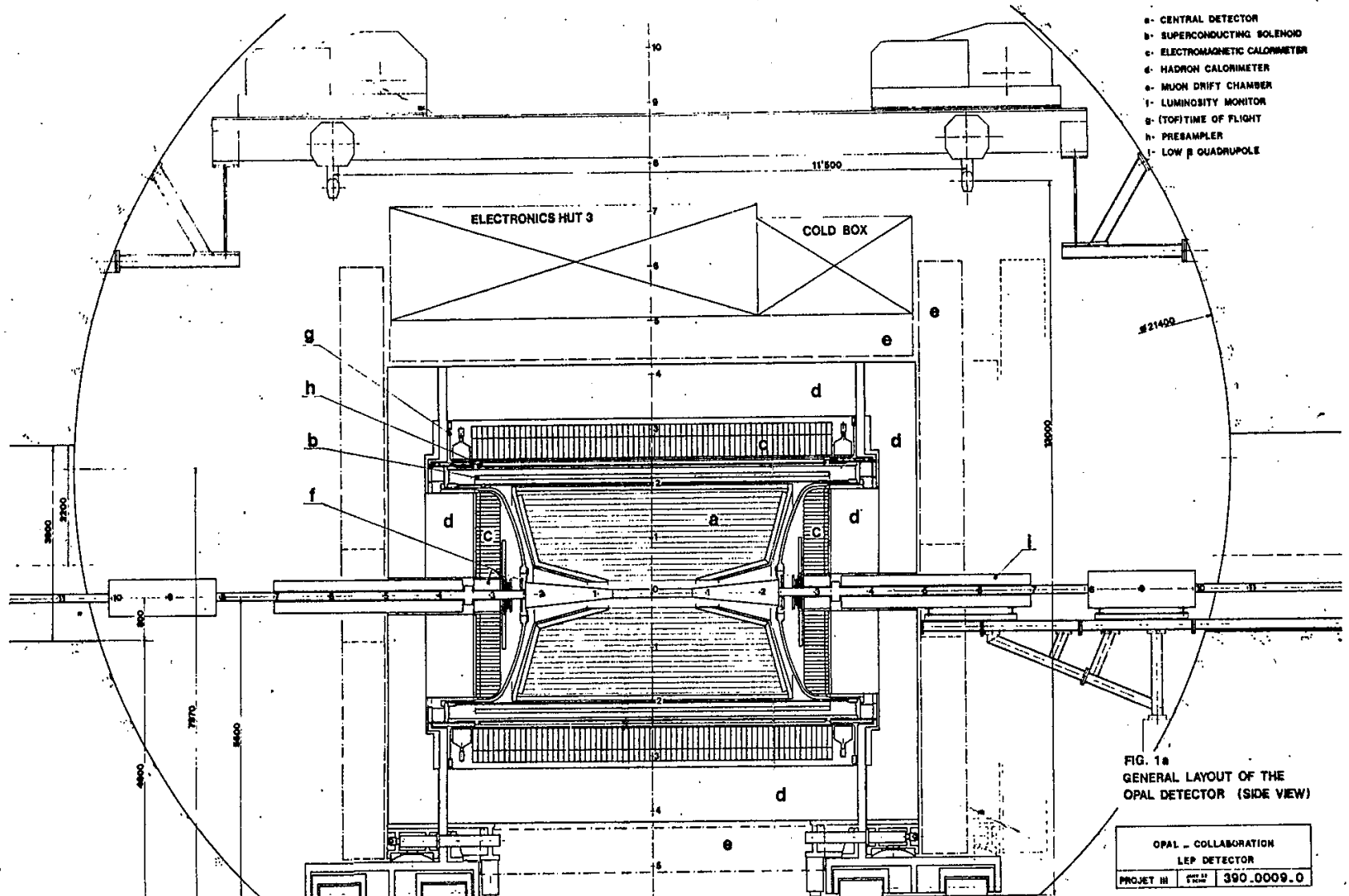
Tomio Kobayashi  
ICEPP, Univ. of Tokyo



OPAL "Reunion"  
21. Oct. 2010



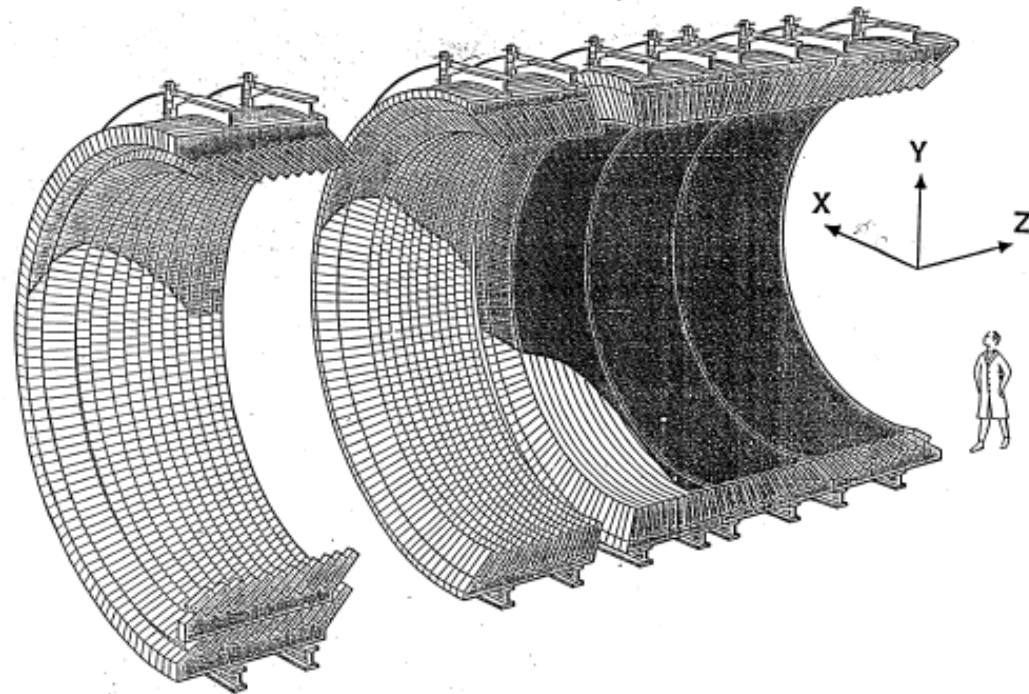
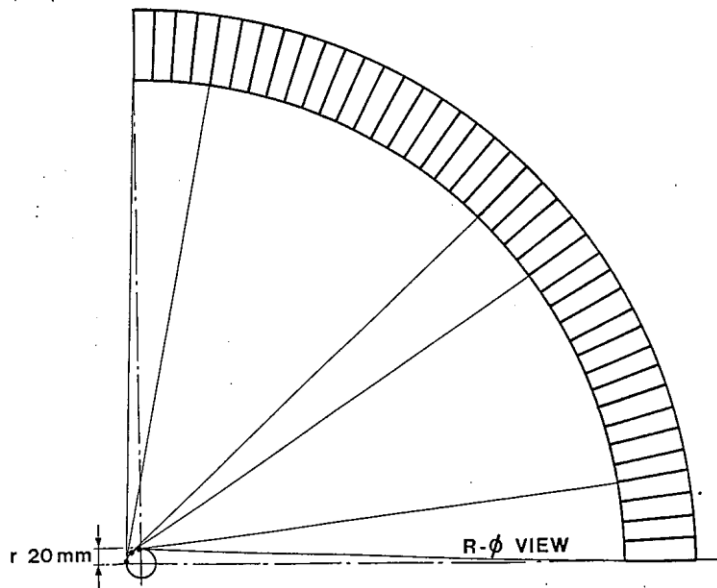
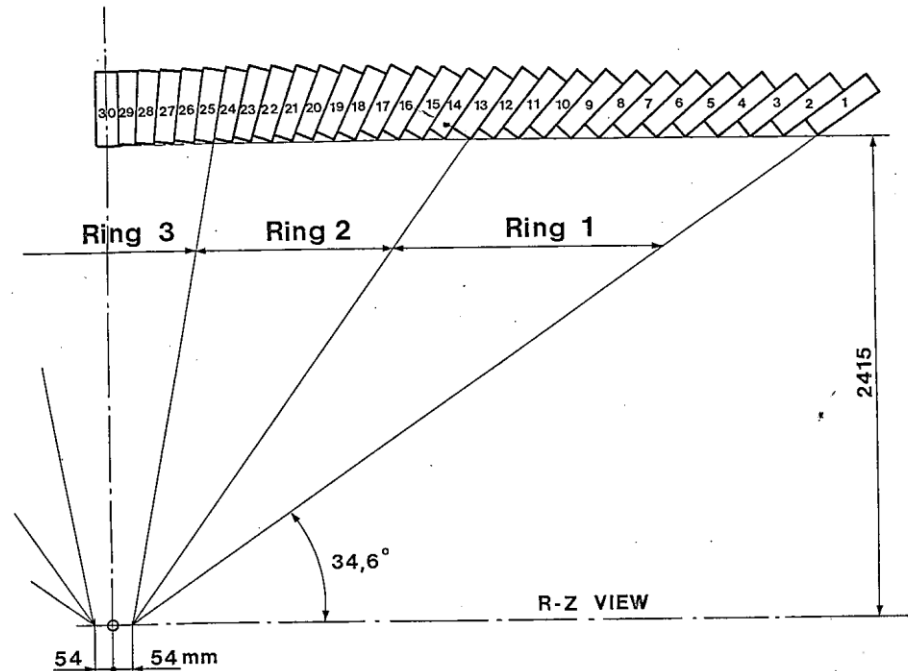
# Original OPAL Design a la JADE (LOI, Jan.1982)



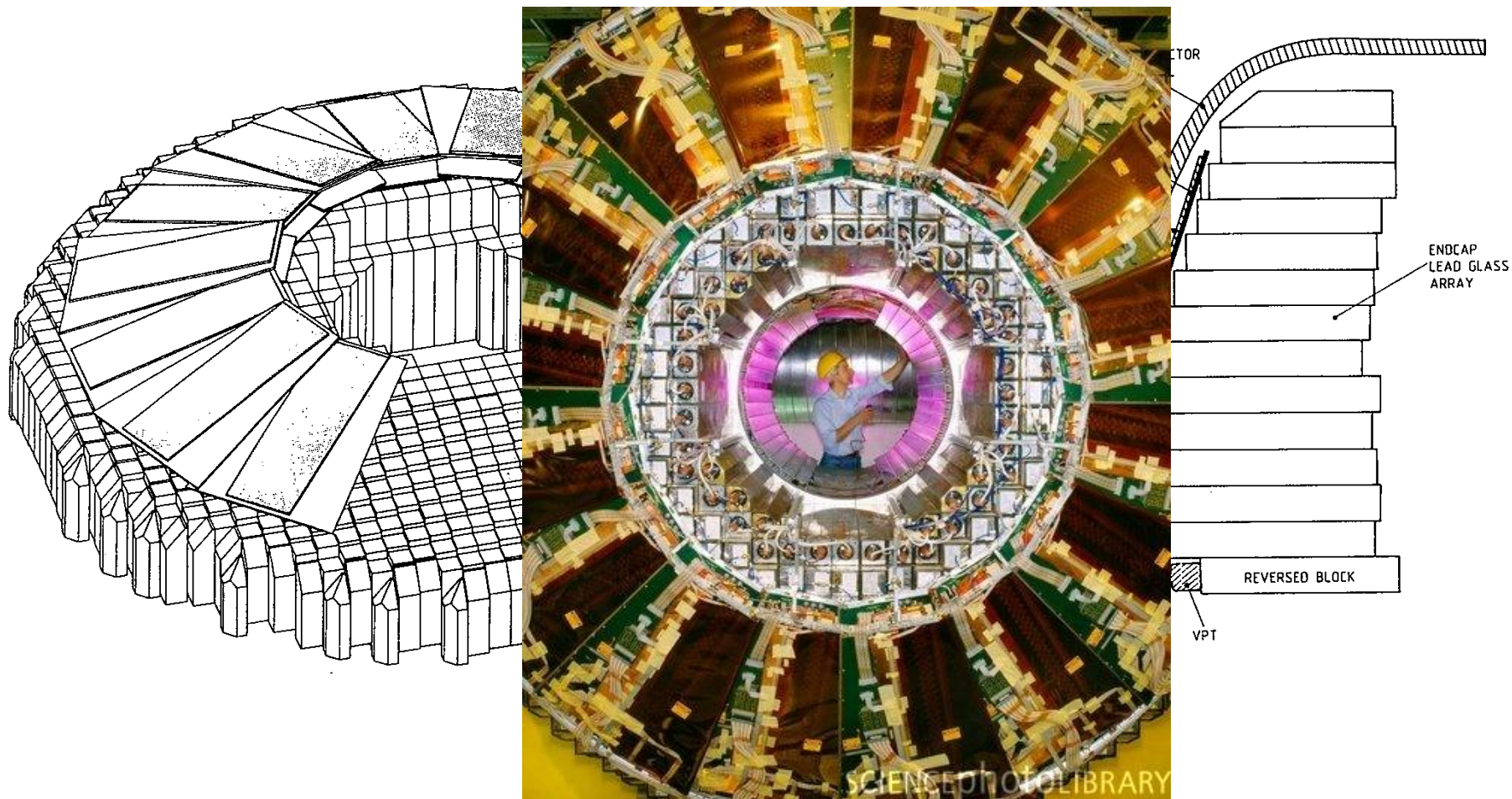
LEPC Advice on LG: parallel geometry → pointing geometry

# Semi-Pointing Geometry

Performance is good,  
but construction is difficult  
and expensive.

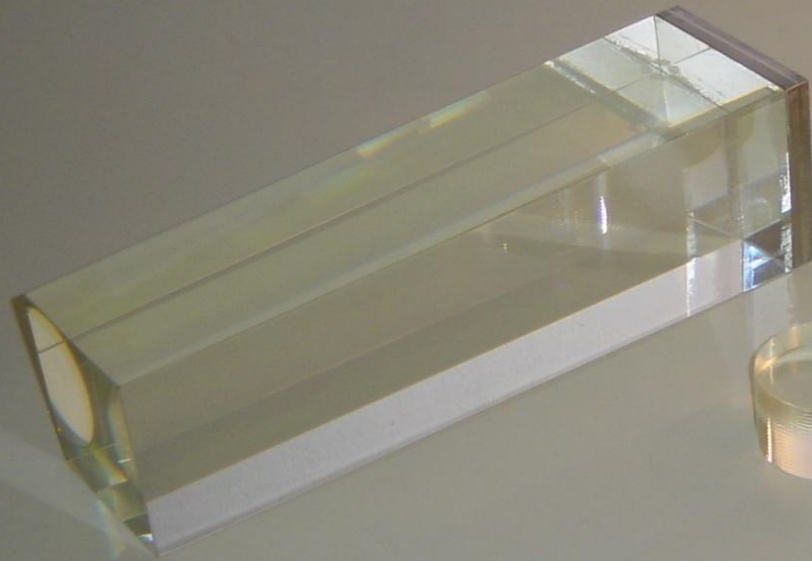


... while EE could stay in parallel geometry



# Main Parts of an EB LG Counter

× 9440 pcs



SF57 (Schott)



R2238 (Hamamatsu)



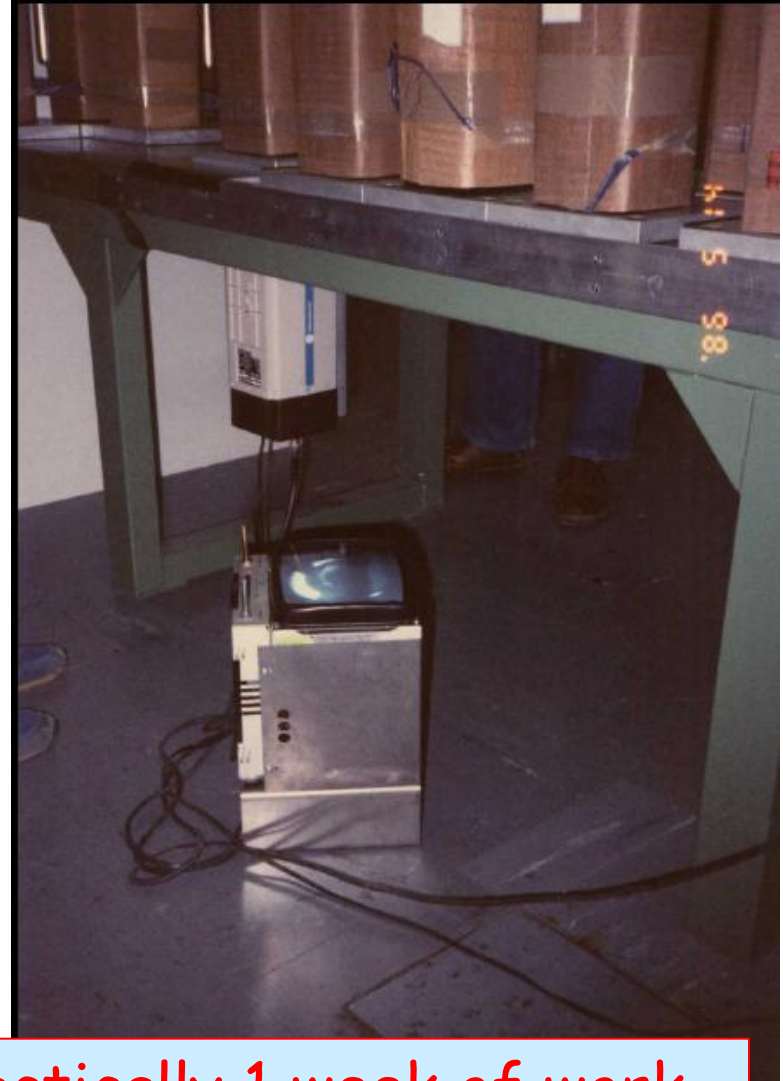
# Assembly Line of LG Modules



B.192

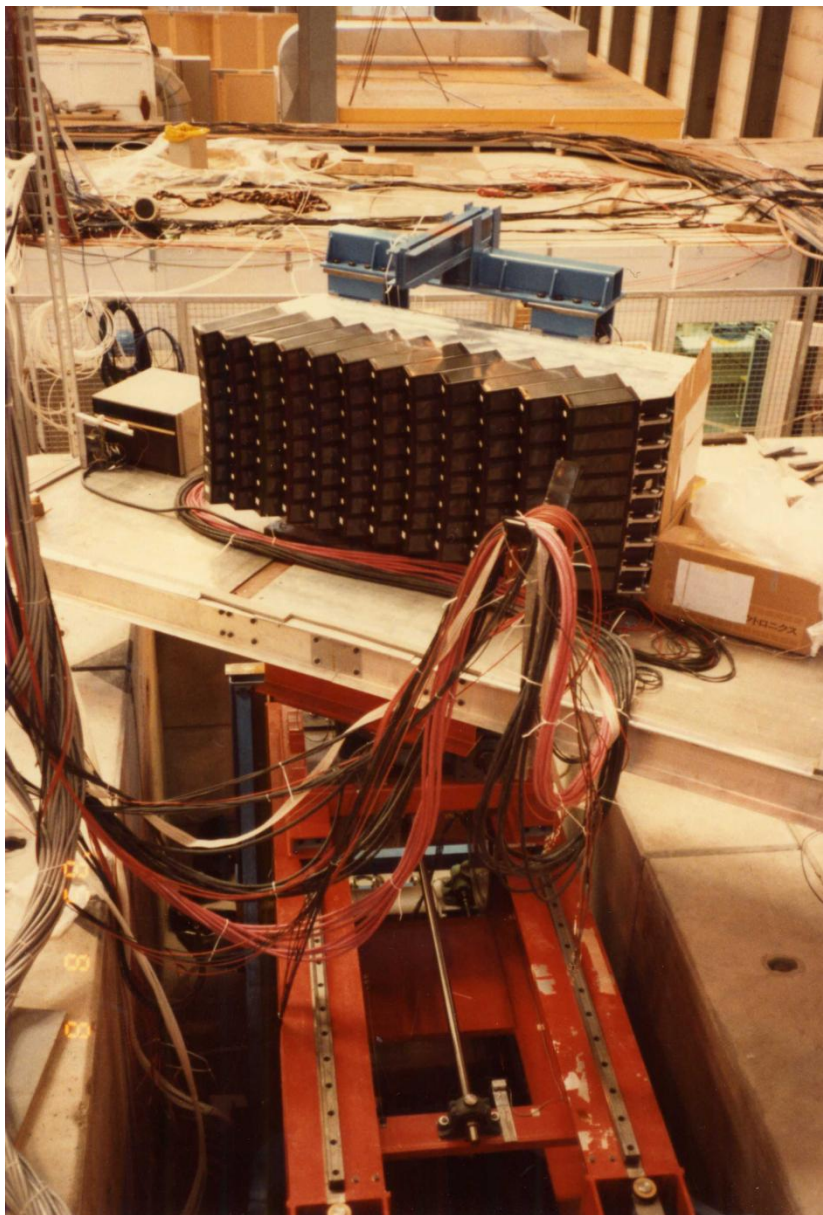


# Many Ideas and Inventions ...

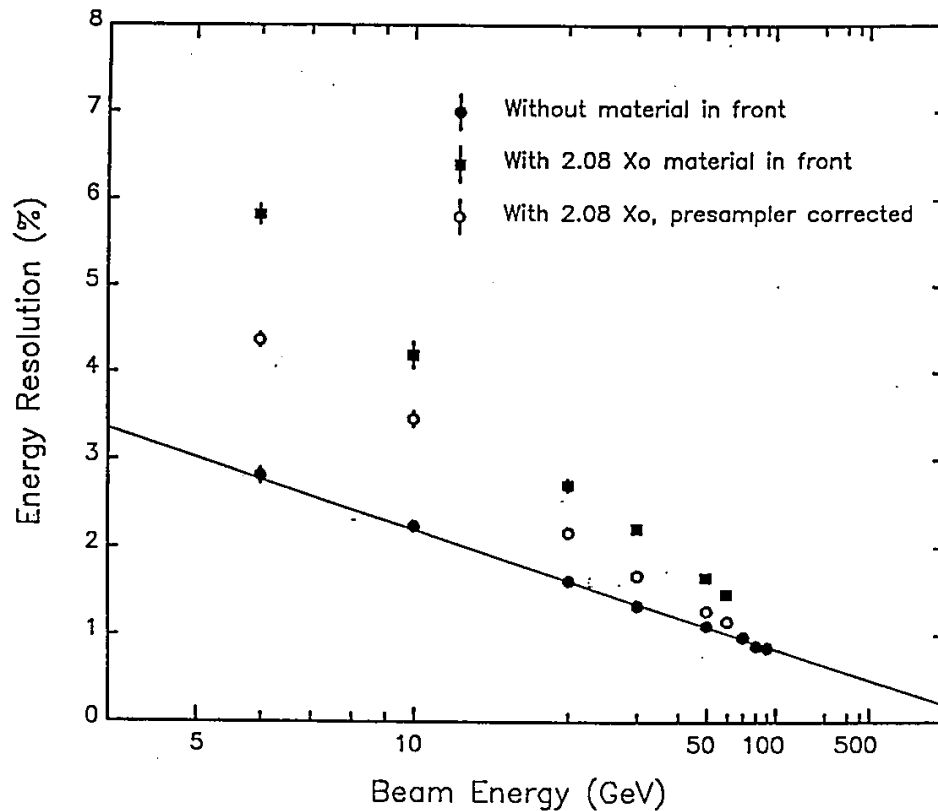


$10 \text{ sec} \times 10,000 \text{ pcs} = 10^5 \text{ sec} \rightarrow$  practically 1 week of work

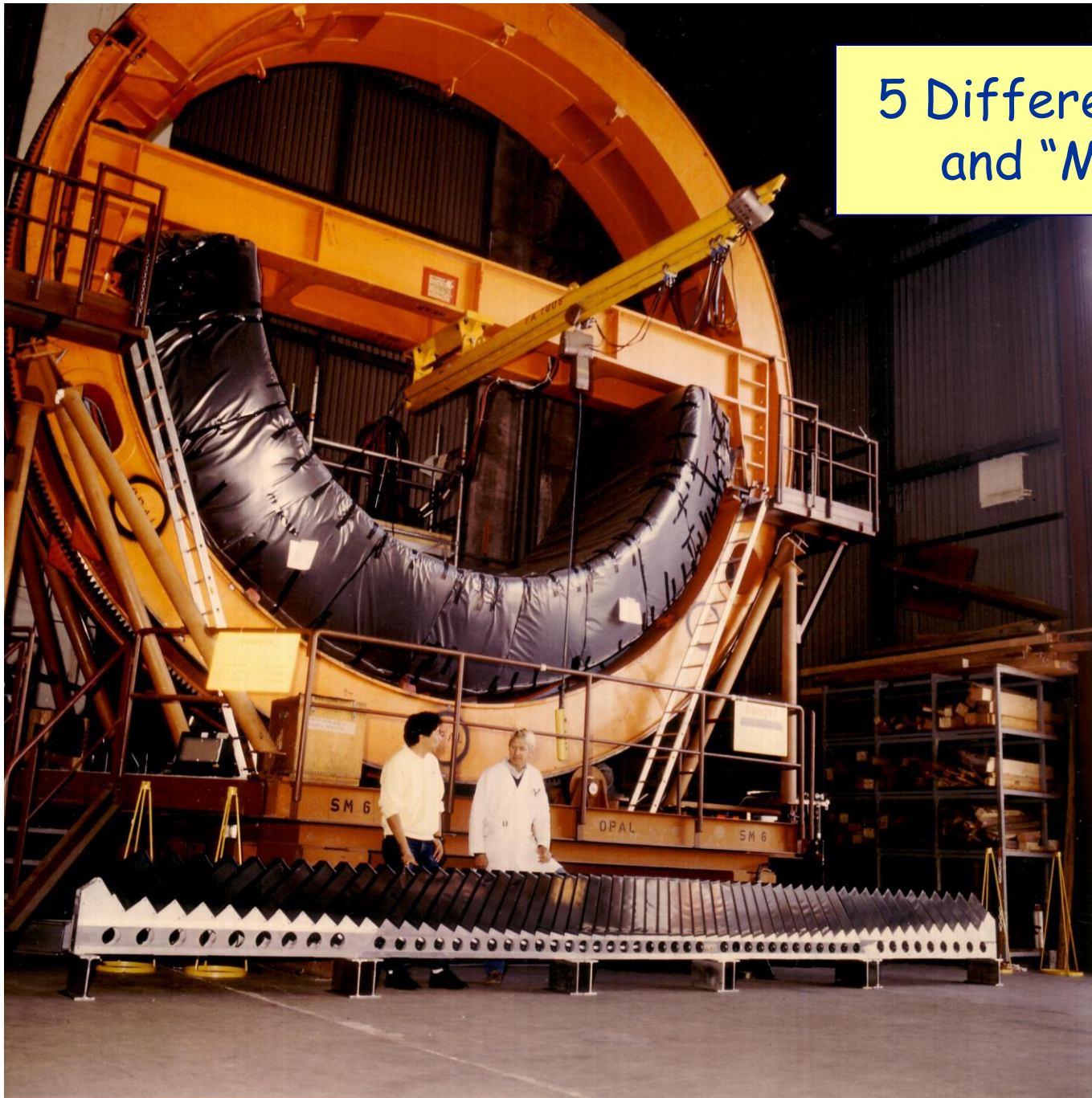


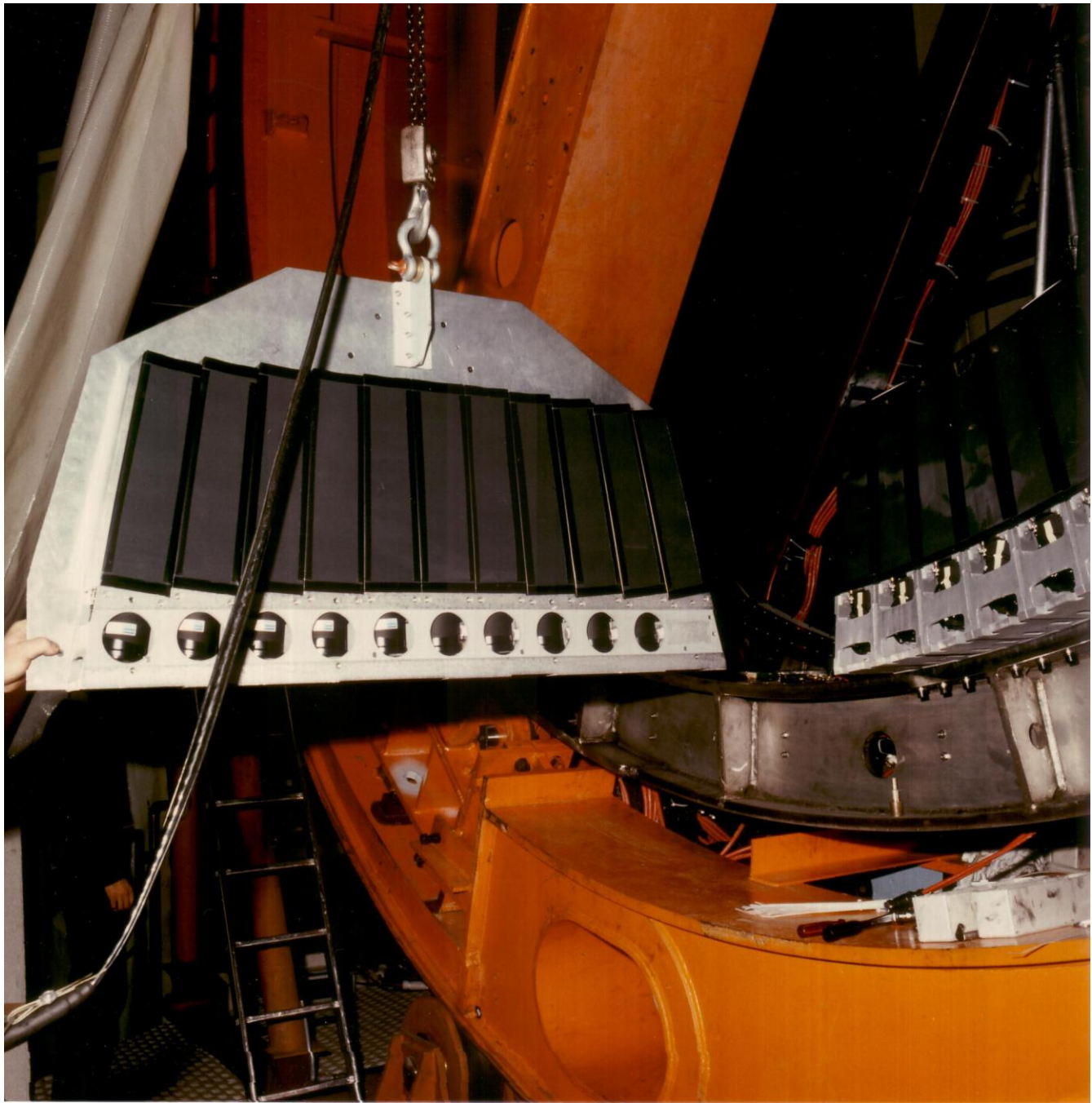


# Combined Beam Test with "Chicago Stage" in X5 Beam Line



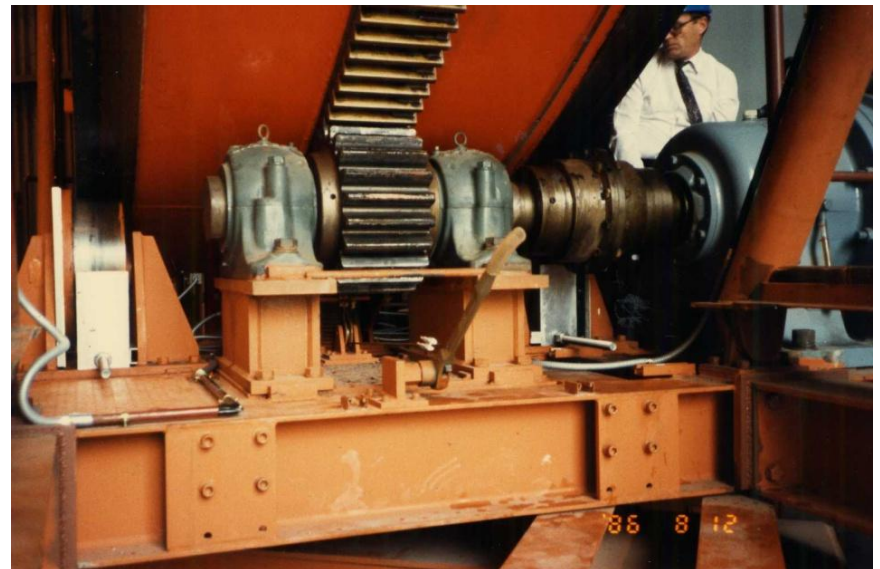
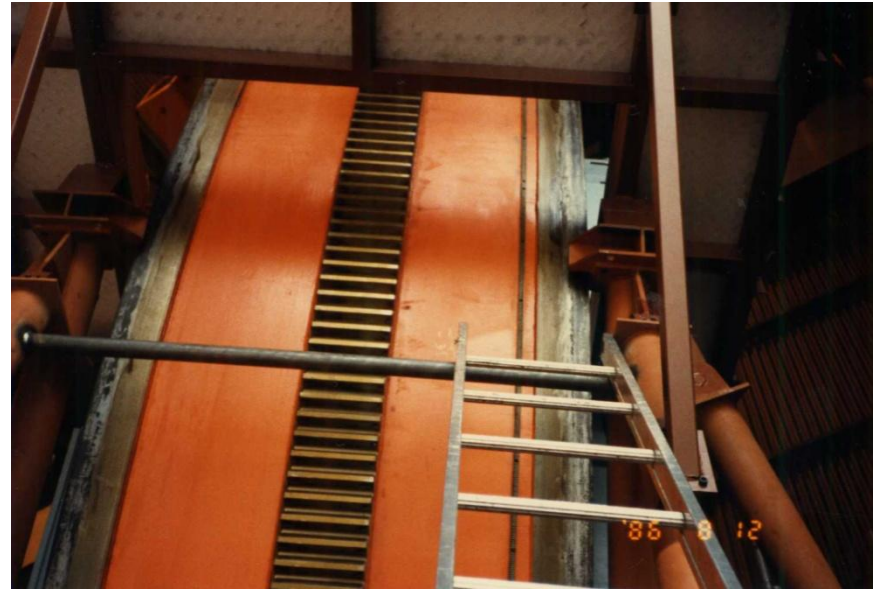
# 5 Different LG Modules and "Mitsui Stage"





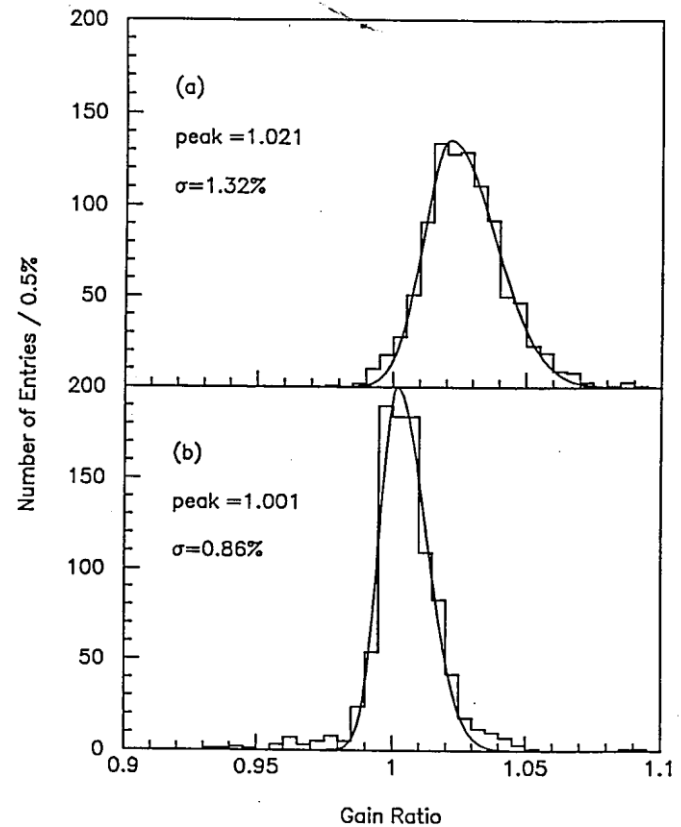
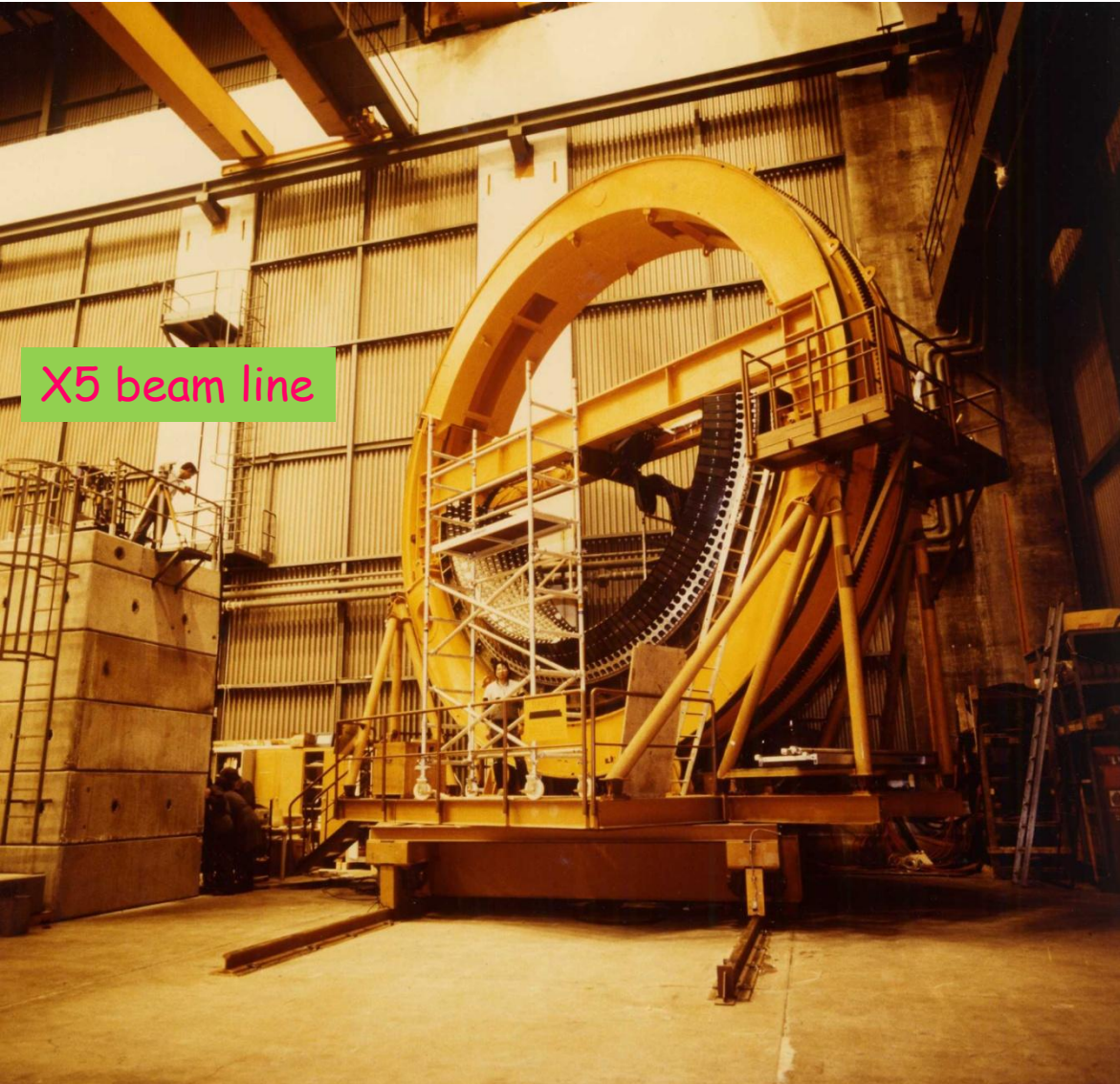


# "Incident" (July 1986)

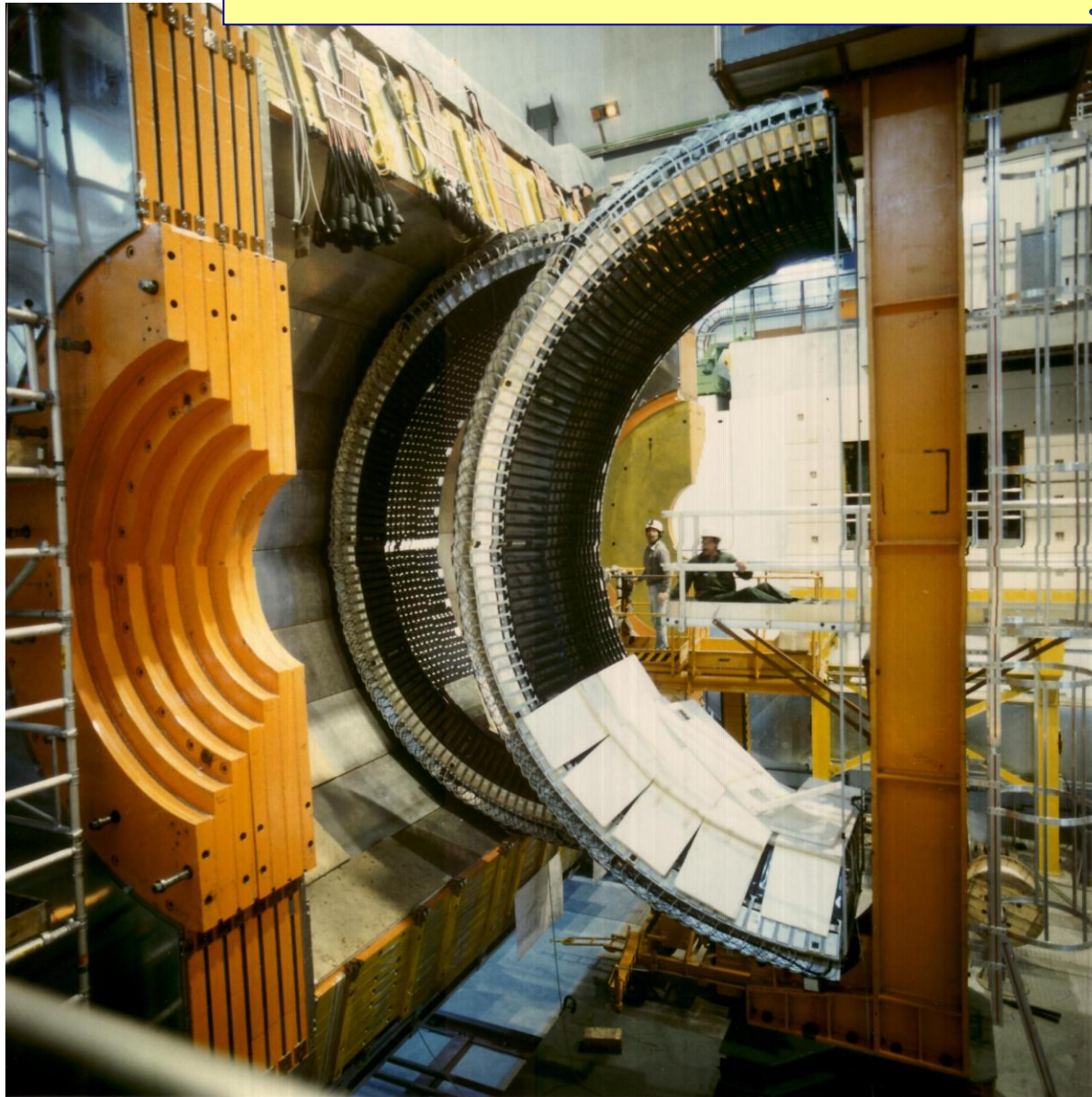


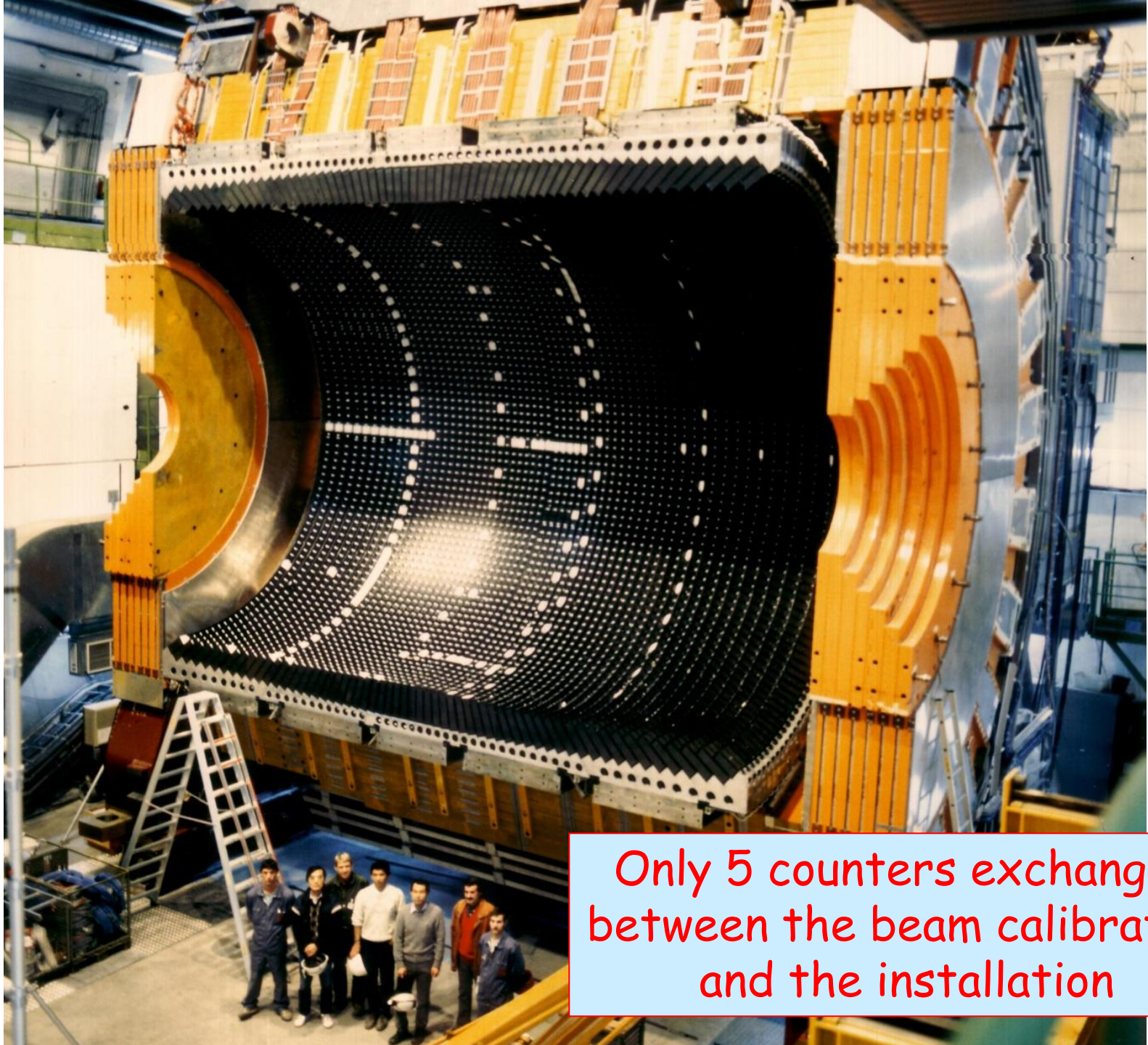
# Beam Calibration with "Mitsui Stage"

(1986 - 1988)



# Installation of HR's in OPAL Pit with "Mitsui Mounting Device"

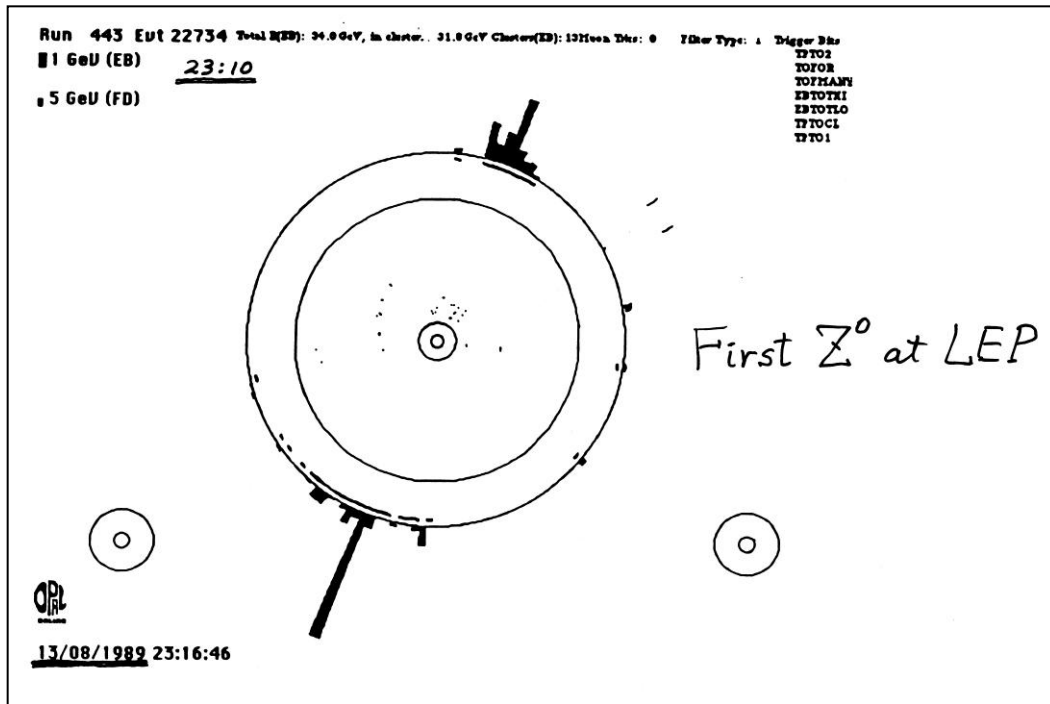




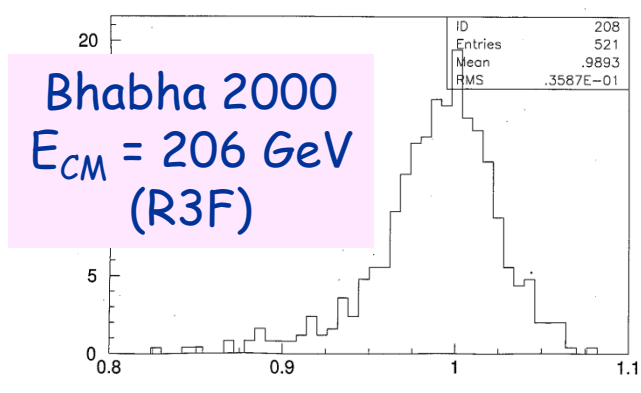
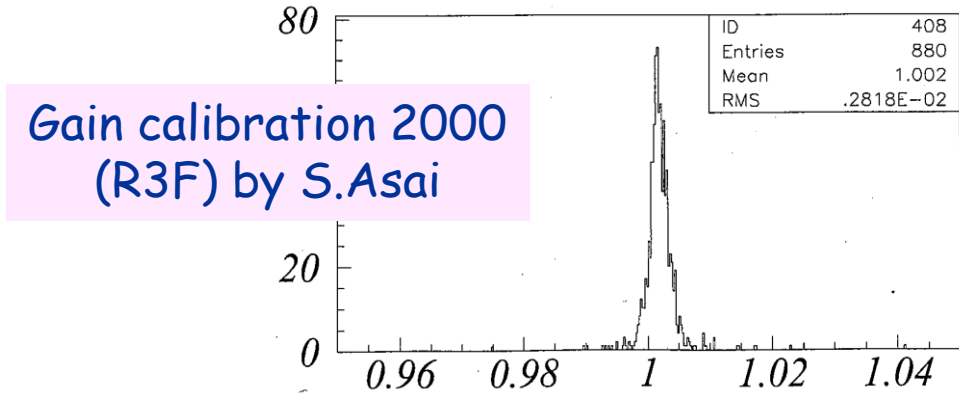
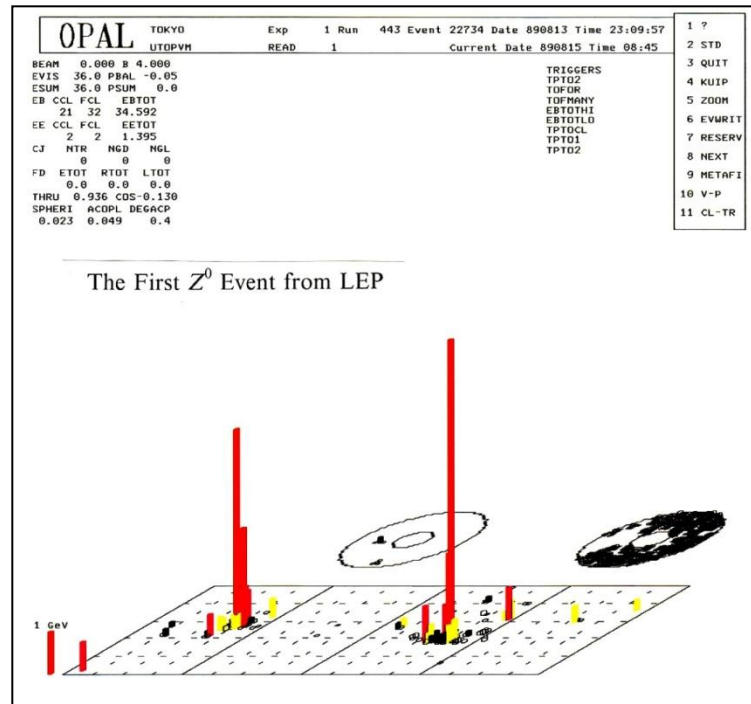
Only 5 counters exchanged  
between the beam calibration  
and the installation



# All of them(9440 pcs) worked so well from the start(1989) till the end(2000)



First  $Z^0$  at LEP



"The Secret"



# "Historical" Reconciliation (Oct.2004)



... with Mr. Hakamada (Director of Sales, Hamamatsu Photonics)