

High Energy Physics

High Energy Physics is the discovery and measurement of the fundamental constituents and their basic interactions.

Physics is concerned with the universe in which we live.

Experiments are how we look at the universe.

(Ideas which are not related to experimental observation are not physics:

Theory \Leftrightarrow mathematics, philosophy, ~~theology~~
Experiment \Leftrightarrow engineering, computer science)

High Energy Physics Experiments

“Smash things together,
see what flies out,
figure out what happened.”

Accelerators and beams
E & \mathcal{L}

25%

Detectors
 σ_{μ} / p_{μ}

50%

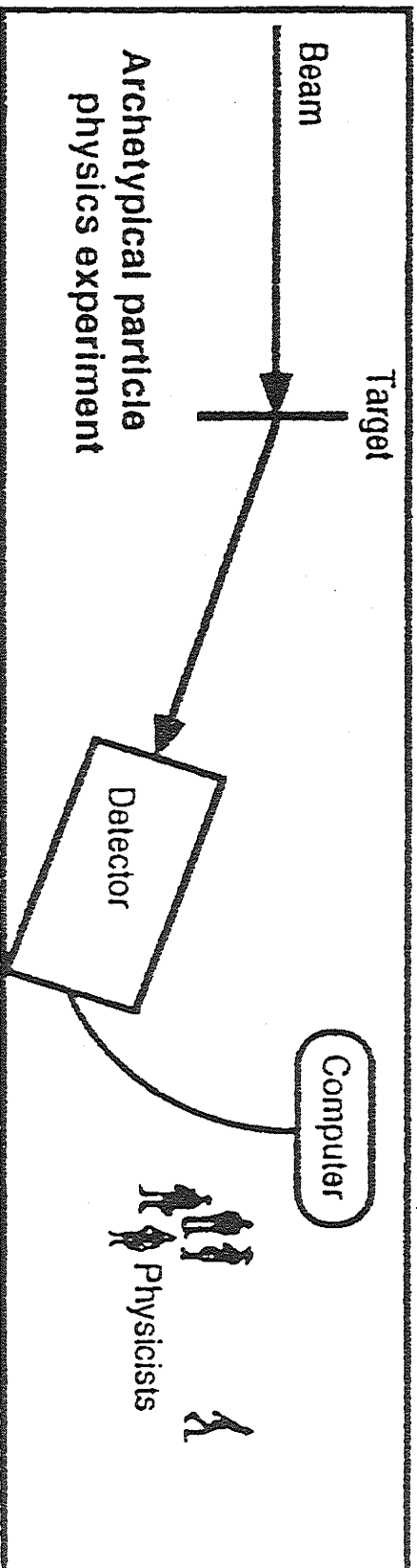
Analysis
S / B

25%

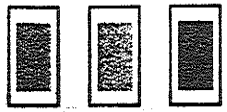
D.C. Bailey
circa 1990.

↖ Theory

Experimental High Energy Physics



team	Rutherford Geiger(RA), Marsden(UG)	CDFE cast of thousands
beam	α particles (Rd, ~5 MeV)	p/p (Tevatron, 900 GeV)
target	foil (Au, Ag)	p/p beam
detector	ZnS screen + eyeball pencil	10000 ion hermetic detector
DAQ (data acquisition)		camac, fastbus, workstations, μ processors, tapes,
analysis	student+pencil	~10 ² , students + workstations + + IBMs + CRAYs +

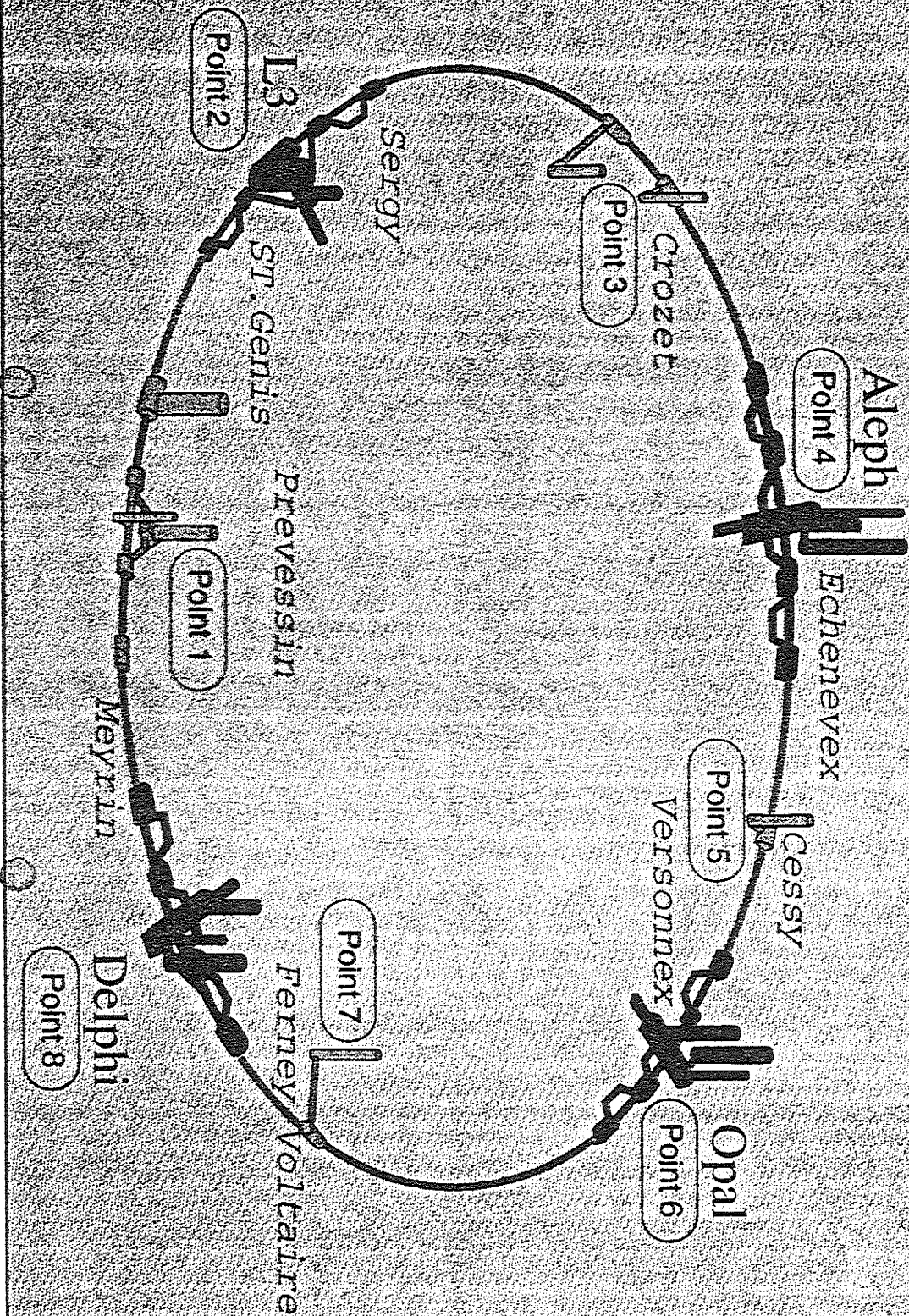


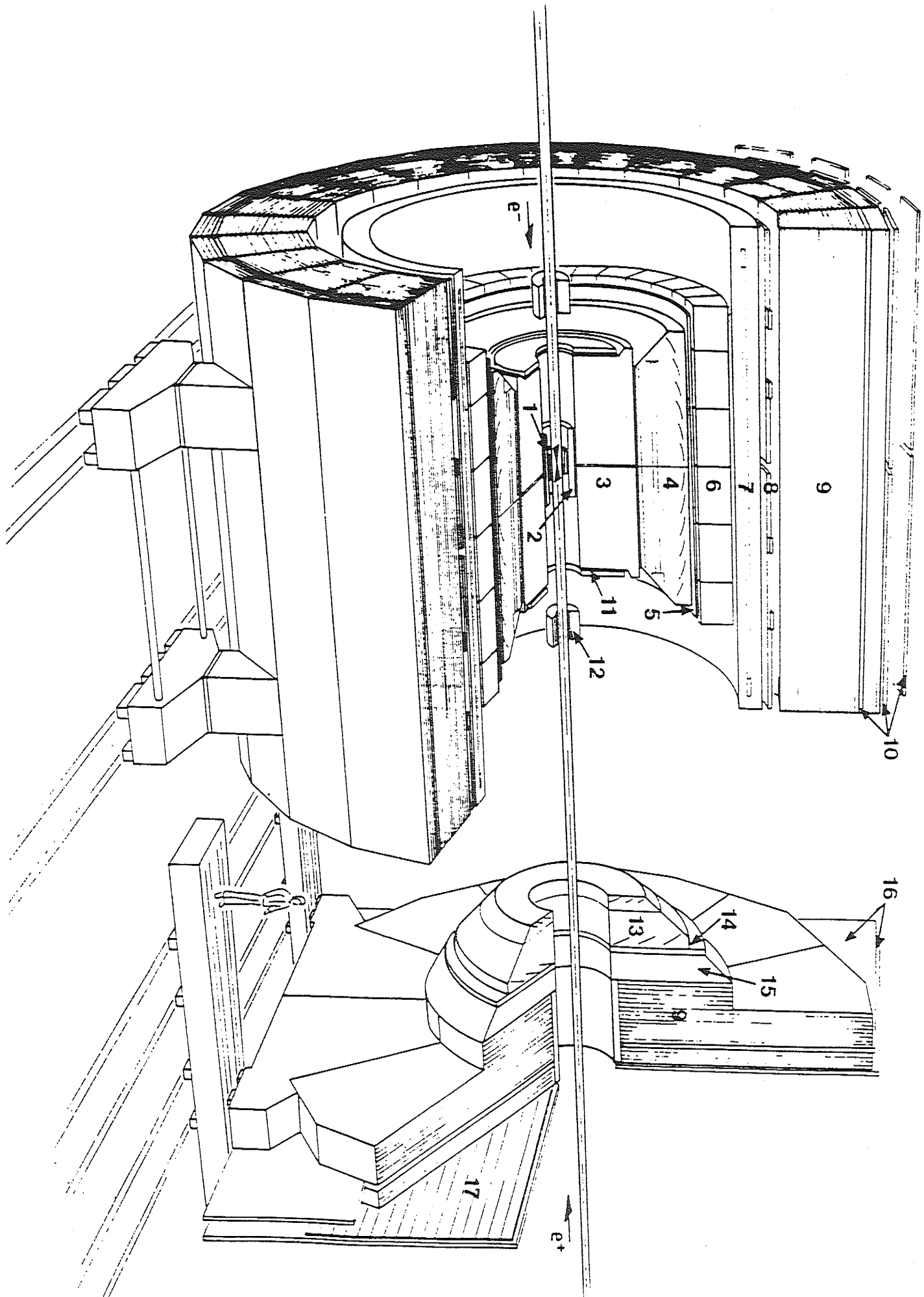
Experimental halls

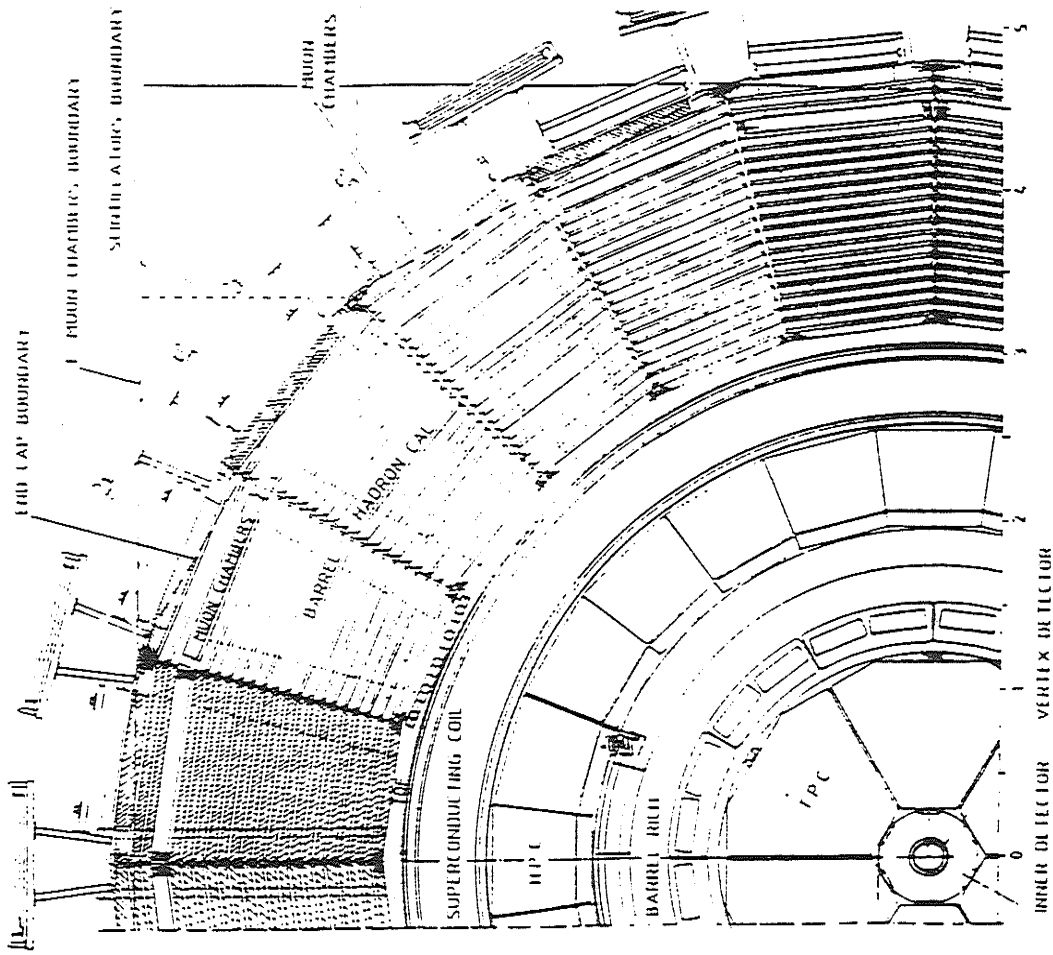
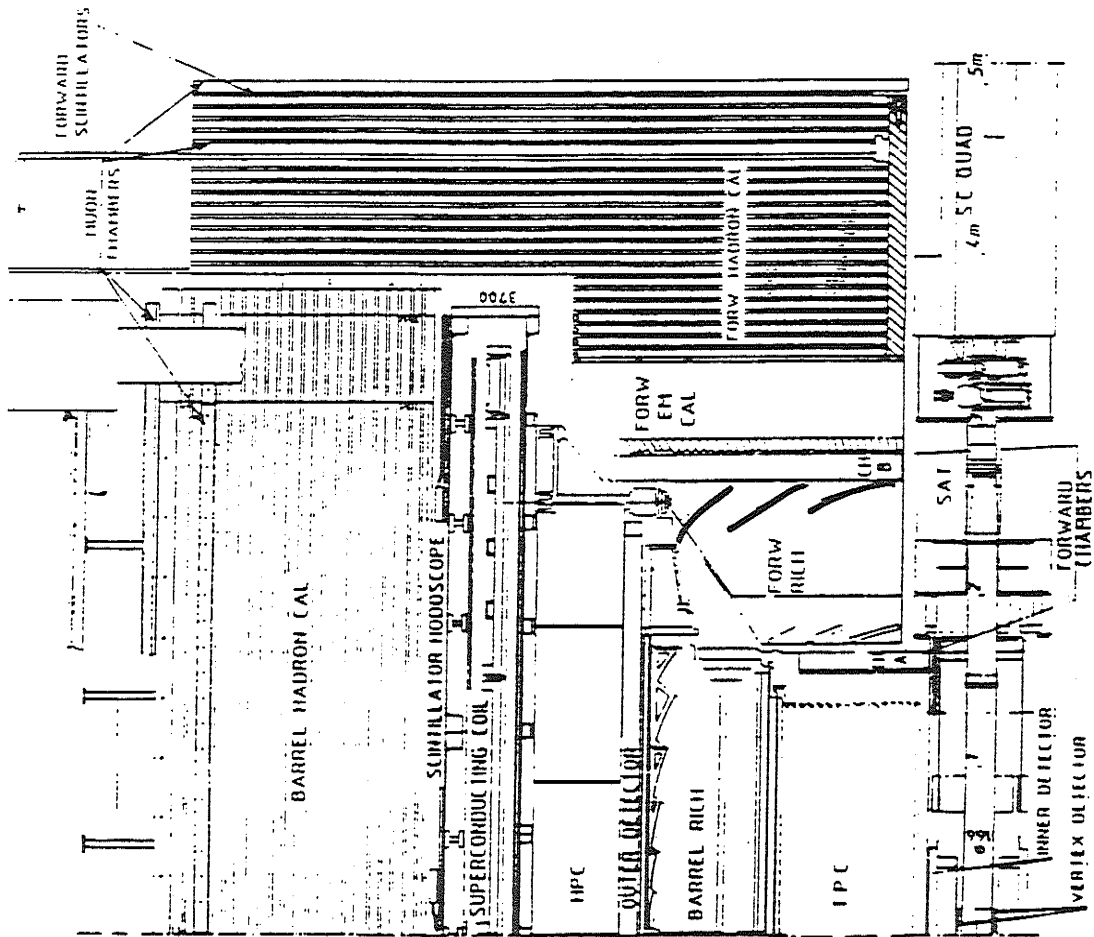
Acces points

LEP tunnel

LEP underground structures







The DELPHI Microvertex Detector

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CDF Detector

