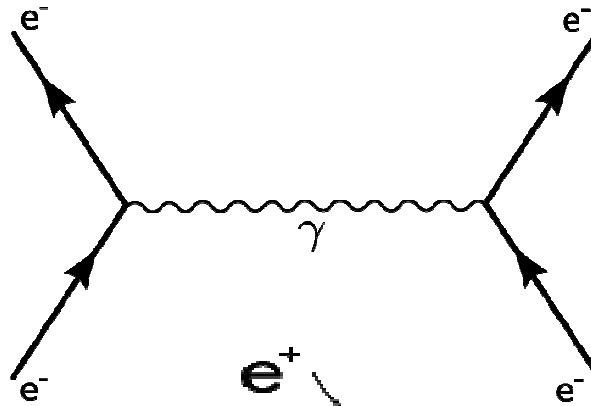


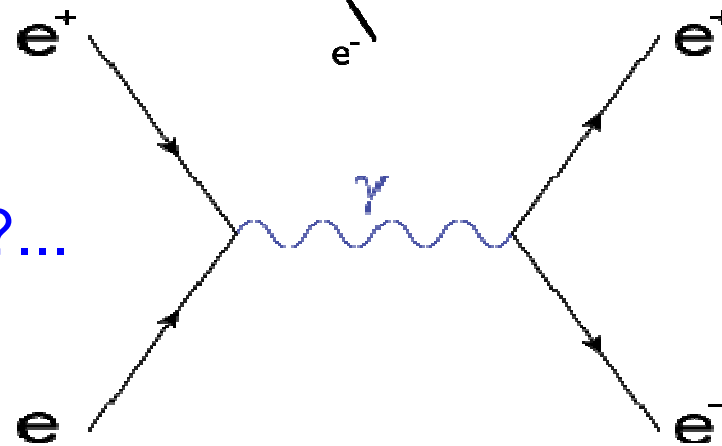
An Introduction to Particle Physics

I - Some theoretical views...

... very basic (?)...

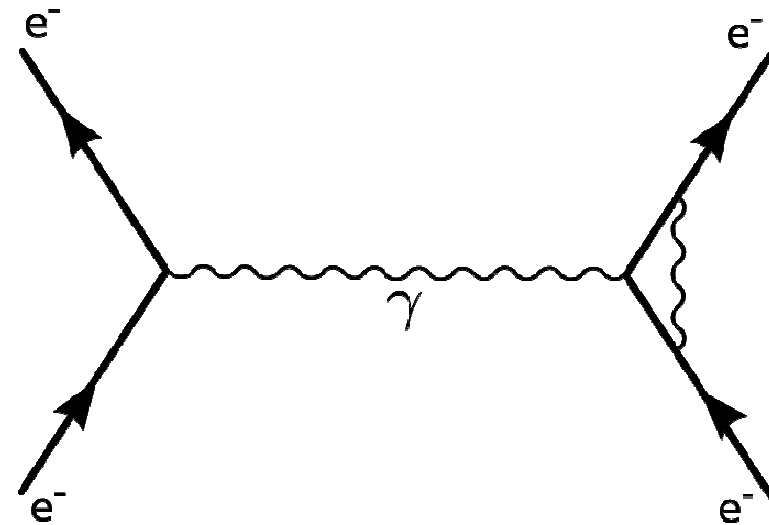
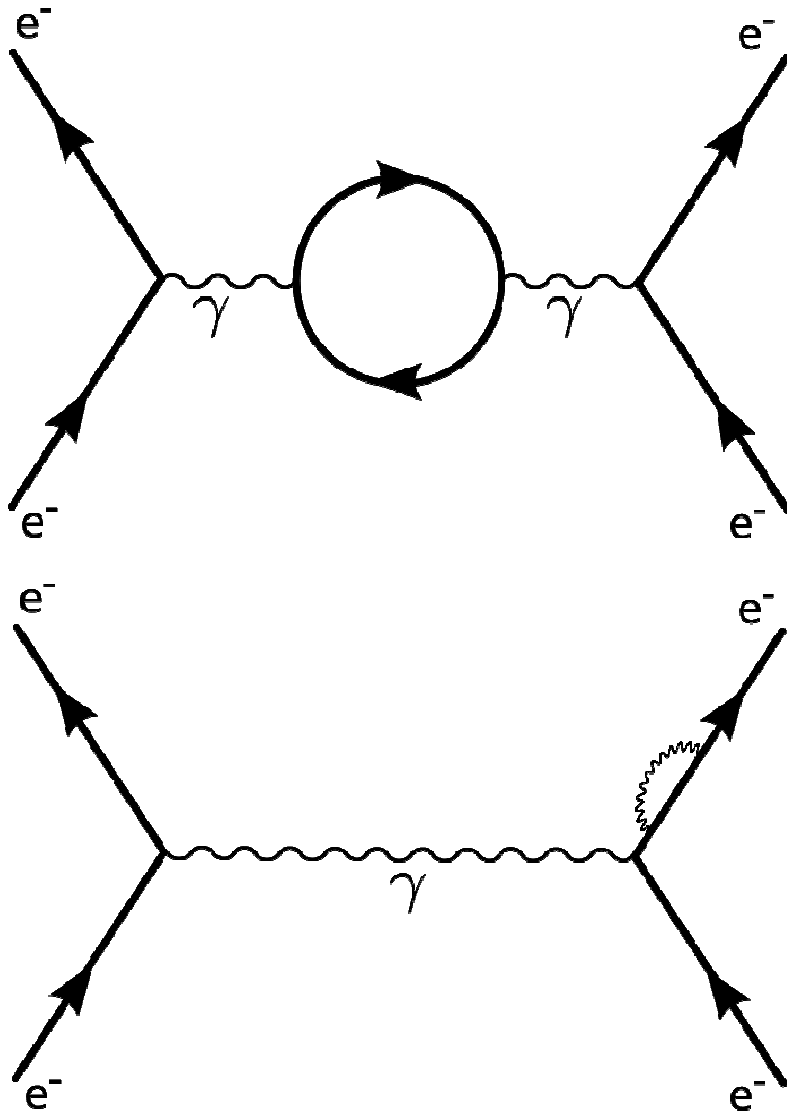


... is there a link?...



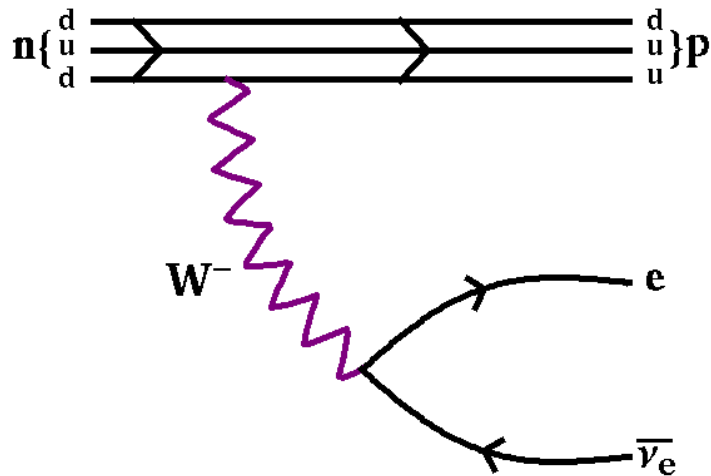
Some theoretical views (cont'd)

... not so evident (2nd order)...

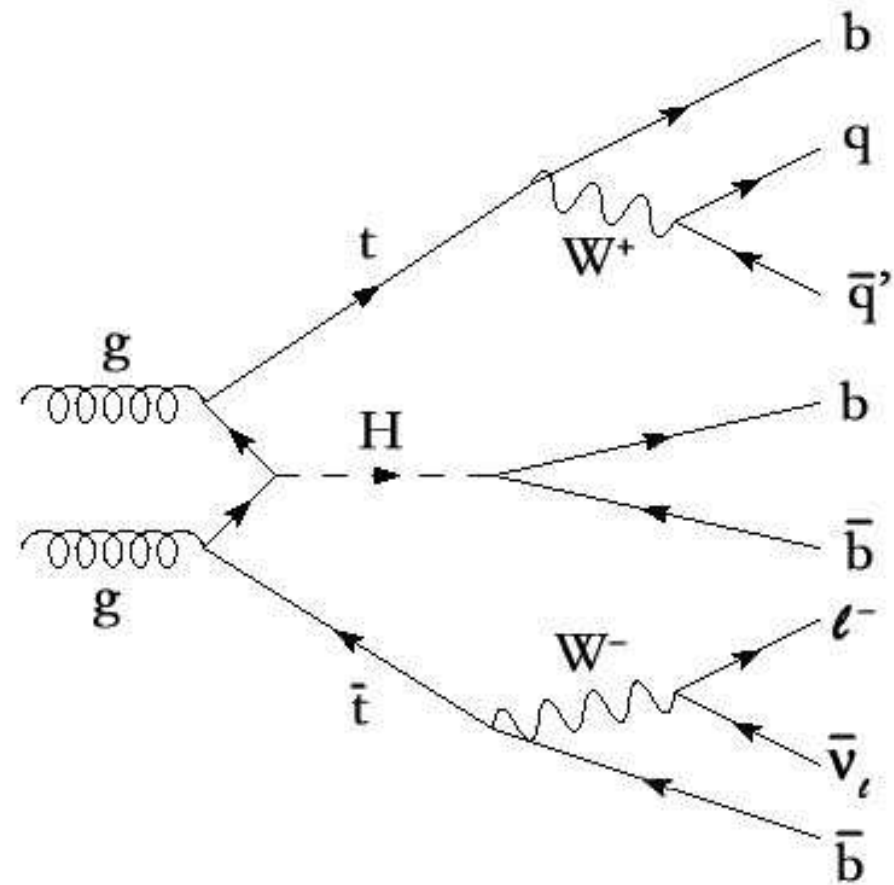


Some theoretical views (cont'd)

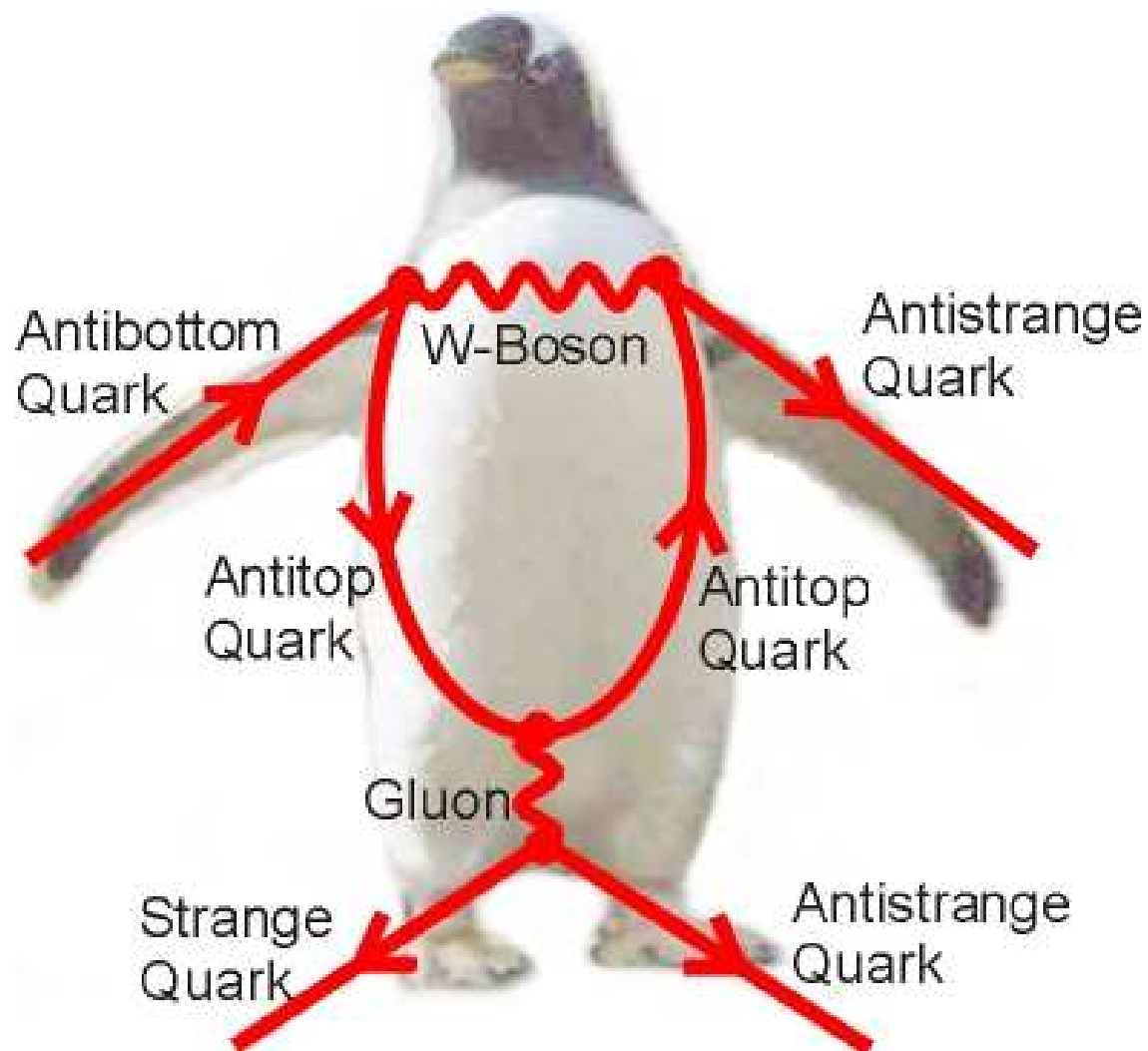
... not evident at all (weak interactions)...



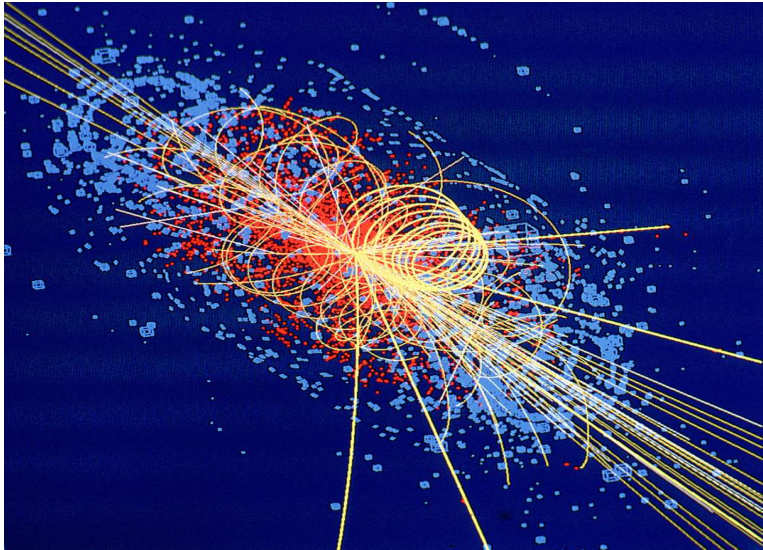
... frankly hostile
(QCD inside)...



... and exotic...

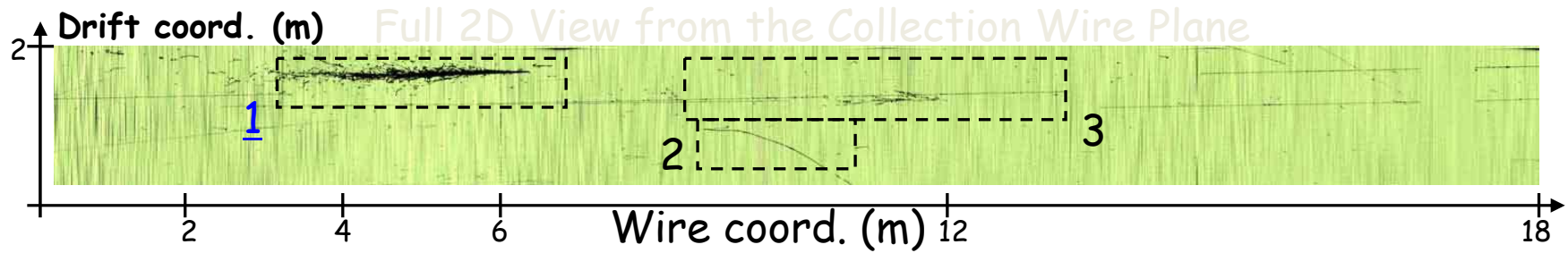


II - Some experimental views



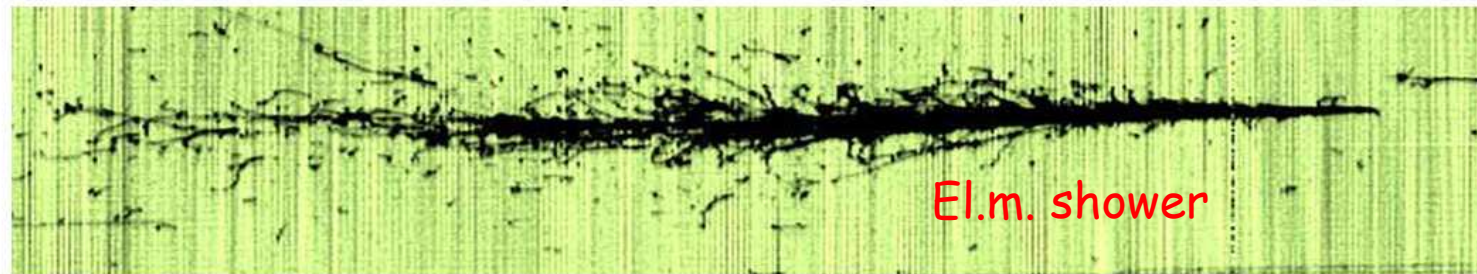
... simulated event

... real events...



Zoom details

1



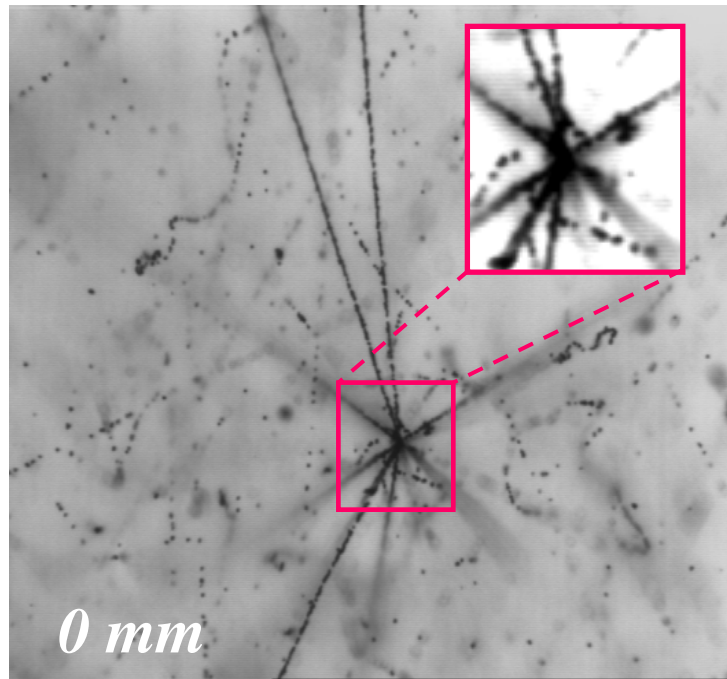
2



3

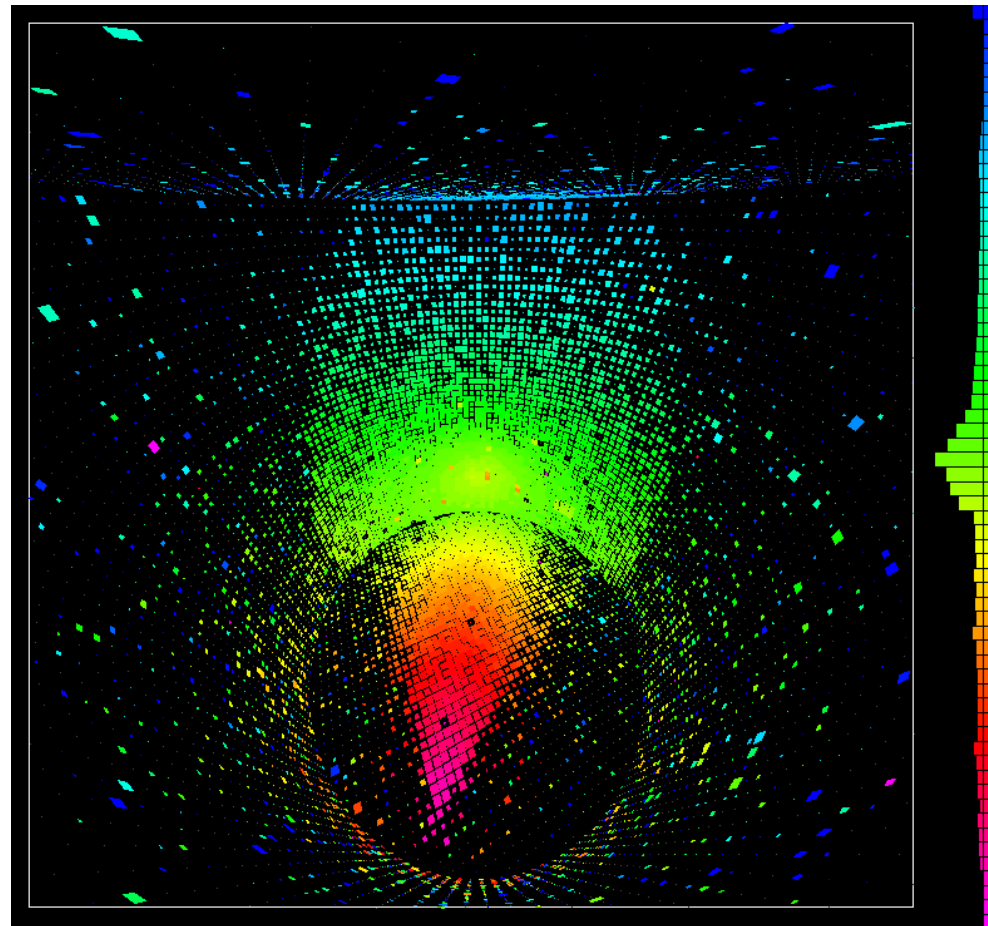


... real events but different techniques...

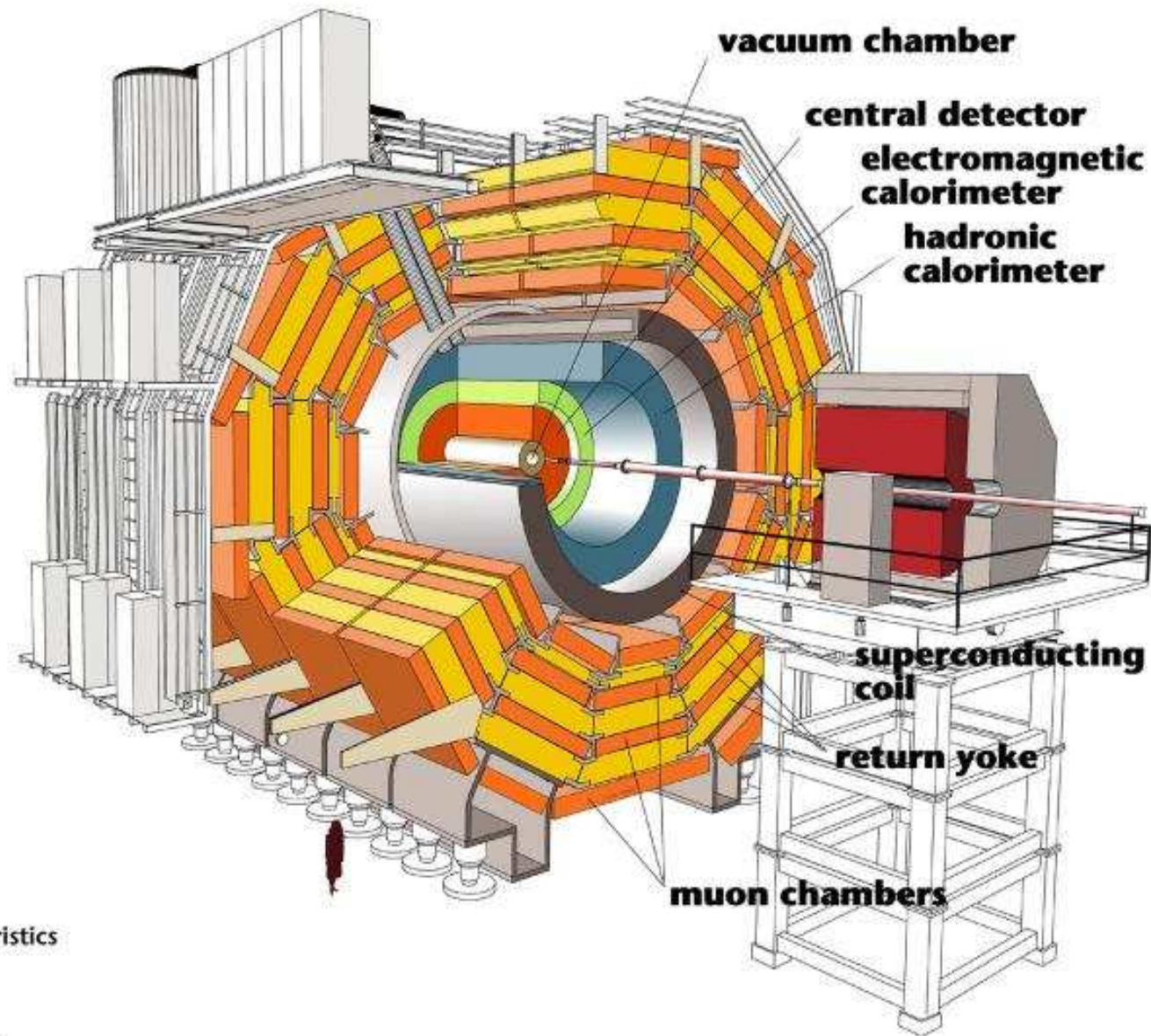


Vertex seen in
nuclear emulsions

Cerenkov light ring



II bis - Some experimental challenges



Detector characteristics

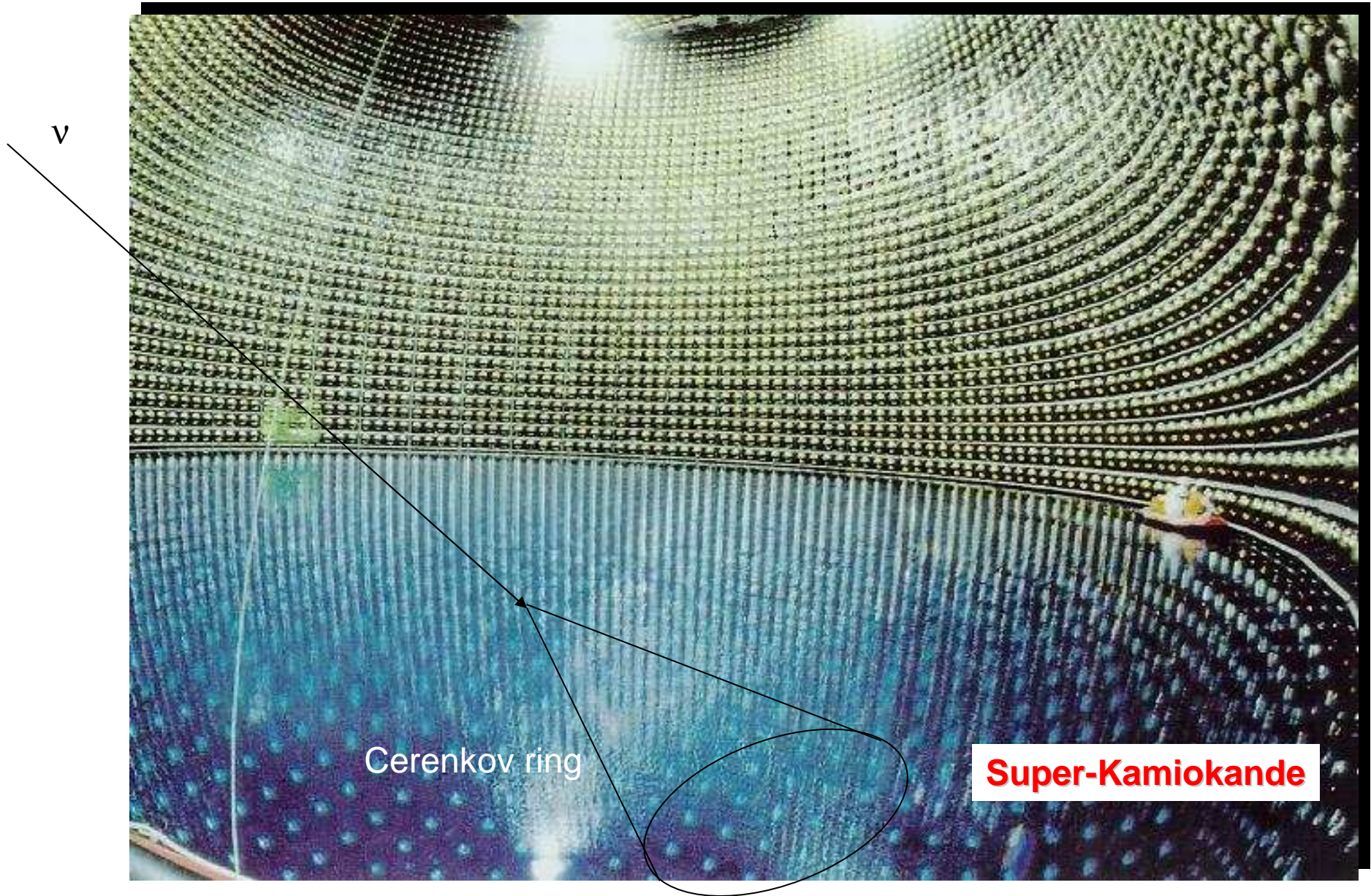
Width: 22m
Diameter: 15m
Weight: 14'500t

II bis - Some experimental challenges





ALEPH @ CERN



v

Cerenkov ring

Super-Kamiokande

Outline/Plan

1/ Particle phenomenology :

quarks & leptons;
Strong, electro-weak interactions;
Some actual problems :
Higgs boson search,
matter-antimatter asymmetry,
grand unification theories...

2/ Experimental facts :

Particle-matter interactions;
Some detection techniques;
Particles production.

3/ The free theory :

Particles spin description;
Propagation equations, propagators;
Lagrangian description.

4/ Interacting theory :

Feynman diagrams;
Cross sections;
Basics of QED.

1/ Phénoménologie des particules et de leurs interactions :

quarks & leptons;
interactions électro-faible & forte;
quelques problèmes actuels :
recherche du boson de Higgs,
brisure matière-antimatière,
théories de grande unification...

2/ Aspects expérimentaux :

interaction particules-matière;
quelques techniques de détection;
production de particules: les grands accélérateurs.

3/ La théorie libre :

description spinorielle des particules;
équations de propagation, propagateurs;
formulation Lagrangienne de la théorie.

4/ La théorie en interaction :

diagrammes de Feynman;
sections efficaces;
Les bases de QED.