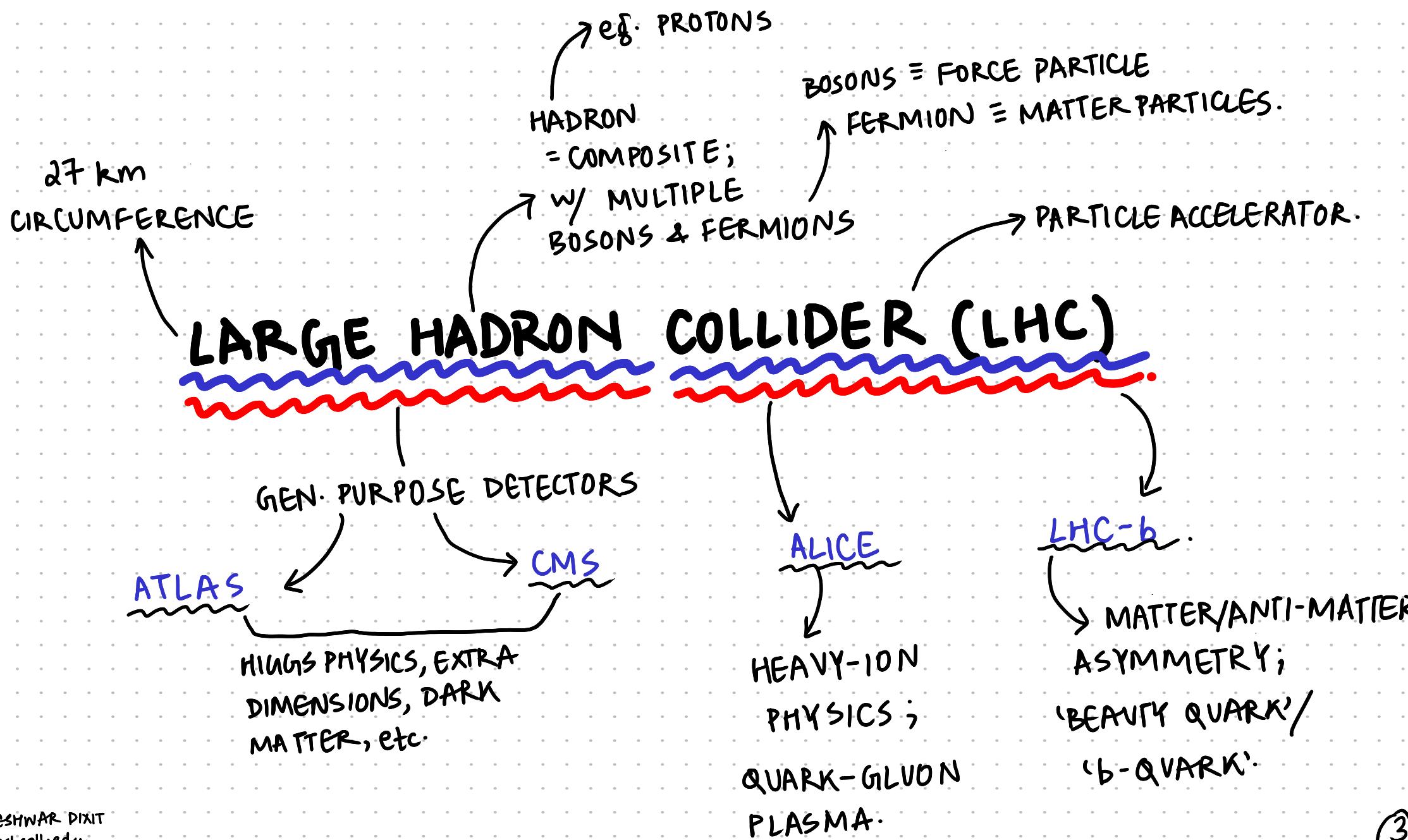


How do we detect these particles?

How do we know they exist?



LHC @ CERN



PARTICLES COLLIDE  
@ EXPERIMENT  
SITES

MULTIPLE  
DETECTORS @  
EXPT. SITES  
TO STUDY  
COLLISIONS!

ELECTROMAGNETS  
ACCELERATE CHARGED  
PARTICLES (MOSTLY  
PROTONS).

ONE SET OF PROTON  
BEAMS MOVE CLOCKWISE/  
ANOTHER ANTICLOCKWISE  
UNTIL THEY MERGE &  
COLLIDE.

BEAMS MOVE  
IN A CIRCLE  
& KEEP GROWING,  
ENERGETIC UNTIL  
COLLISION.

PROTONS SENT IN  
'BUNCHES' w/  
25 ns SEPARATION.



# COMPACT MUON SOLENOID (CMS)

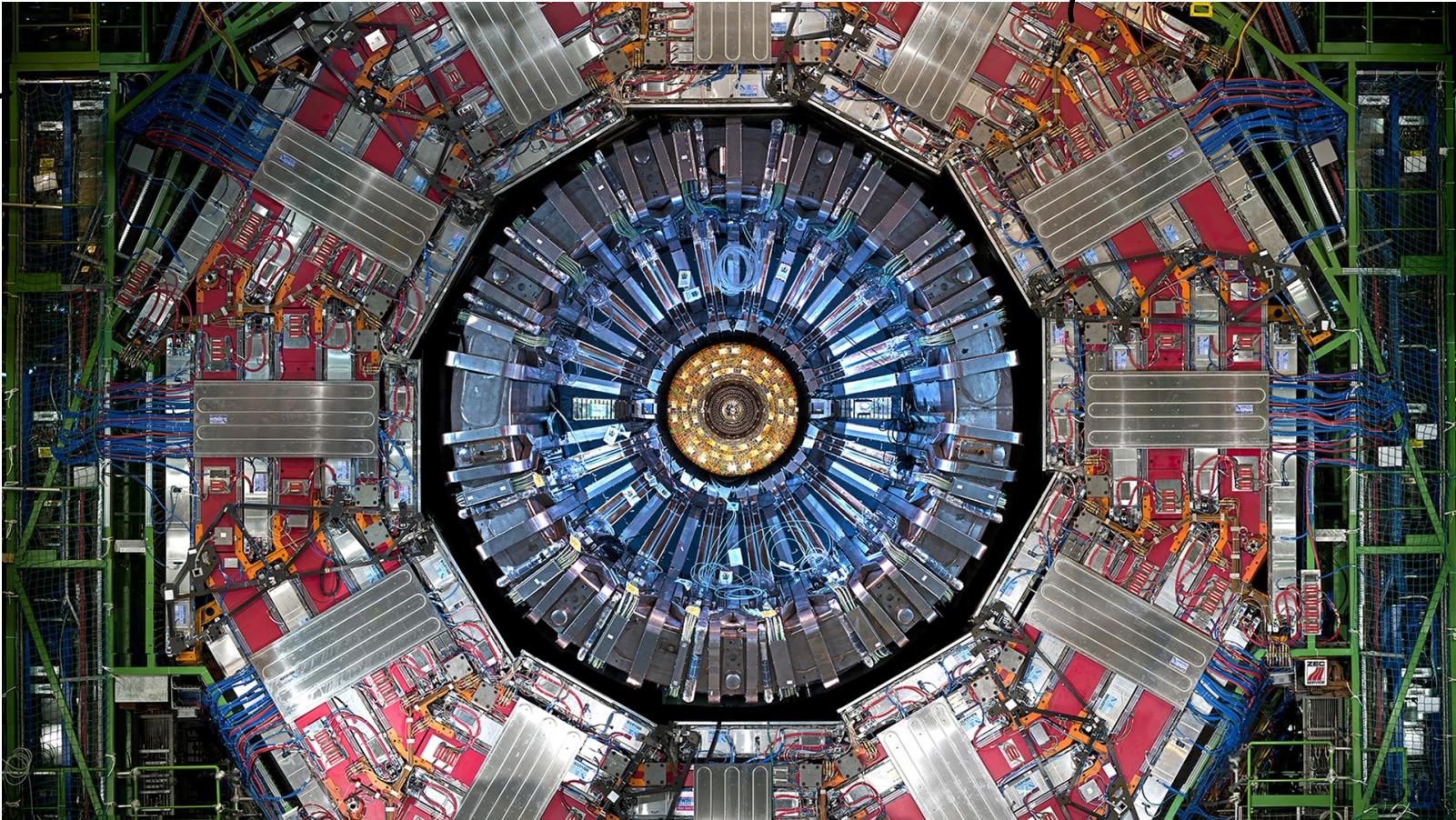
15m x 21ft.

GOOD @ DETECTING  
MUONS

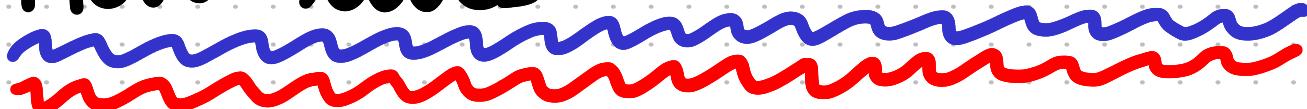
MOST POWERFUL  
SOLENOID EVER  
MADE!

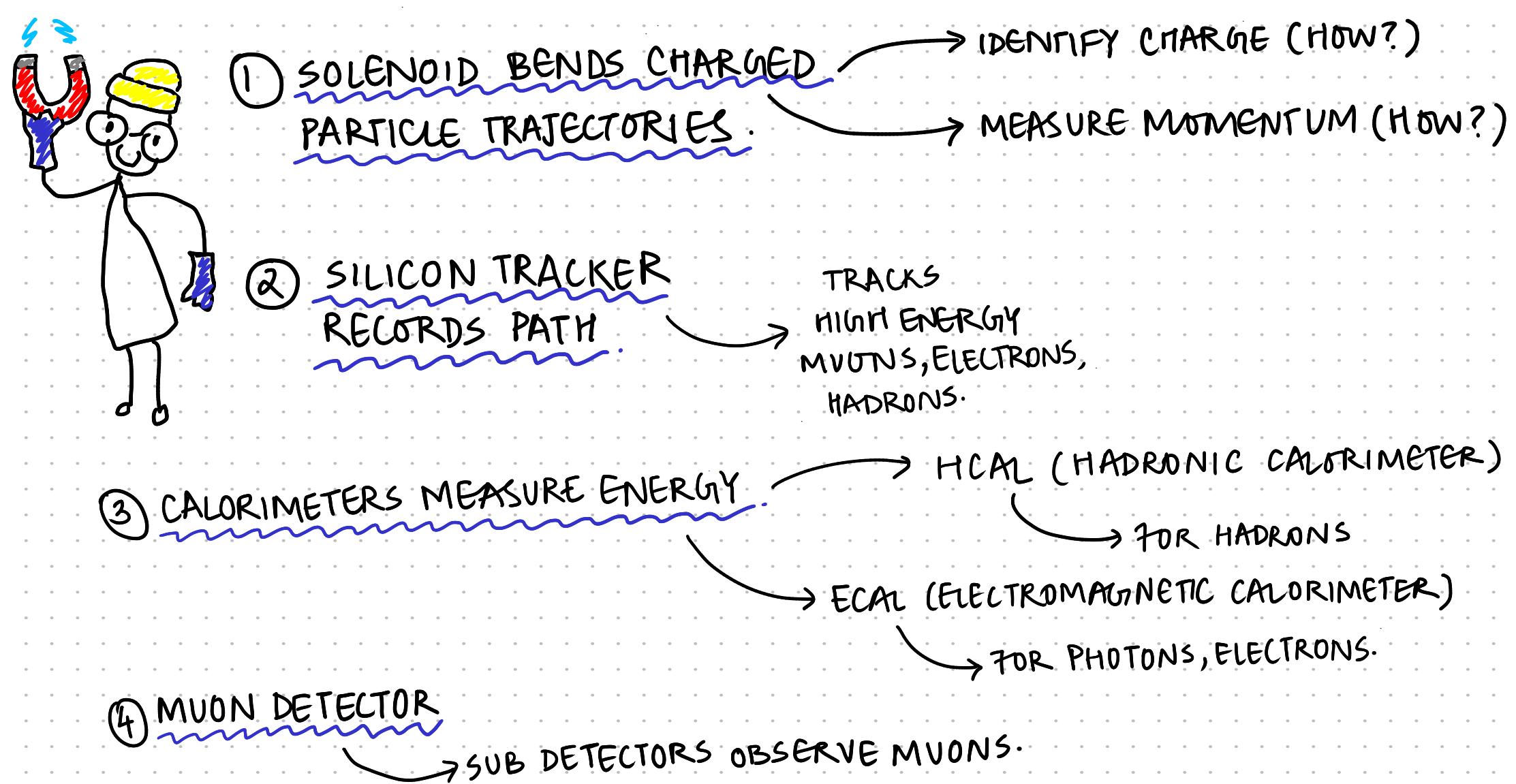
LIKE A 'HIGH SPEED  
CAMERA' TAKING '3D  
PHOTOS'.

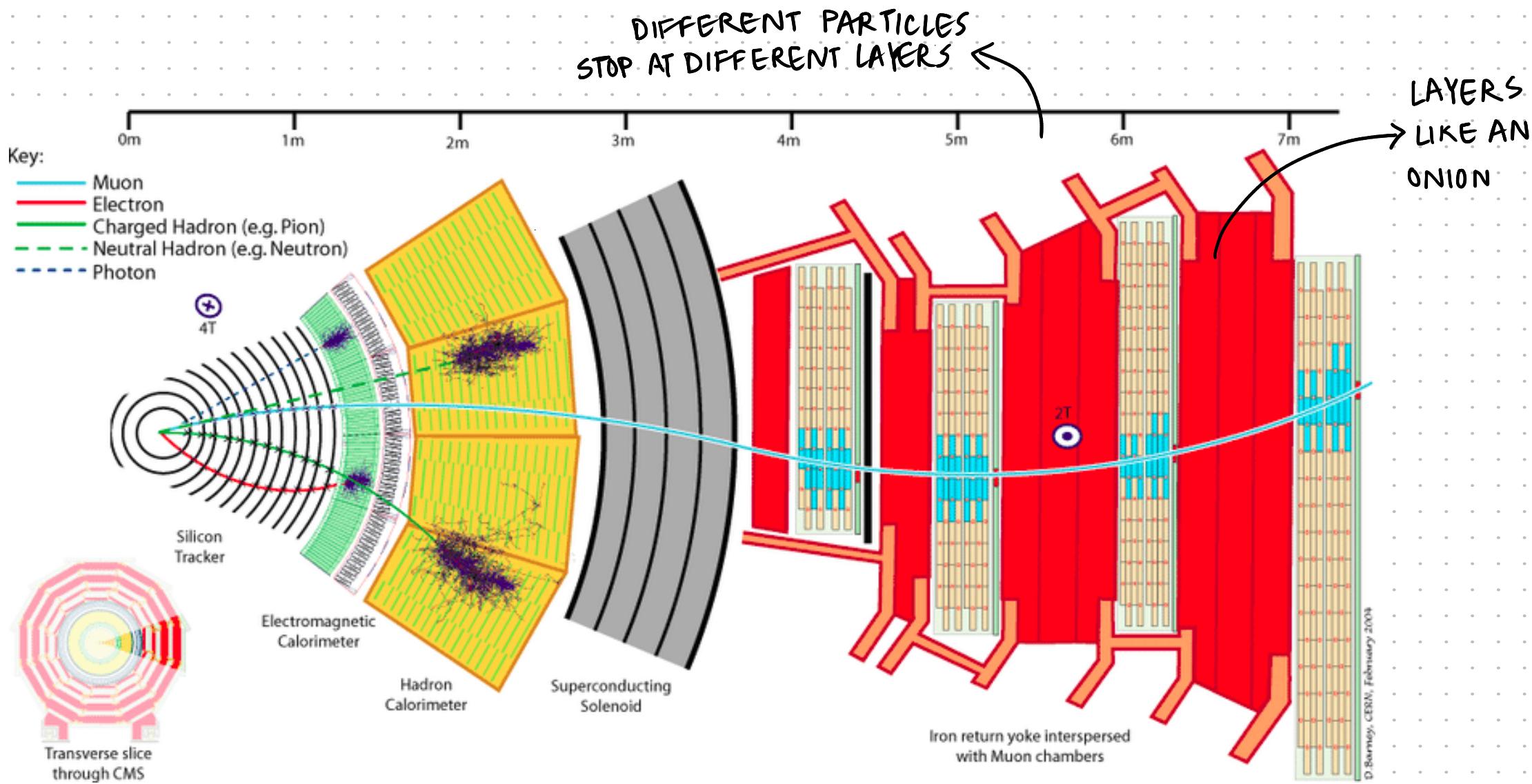
COLLISION PRODUCTS  
ARE UNSTABLE  
BUT DECAY INTO  
STABLE PARTICLES  
THAT CAN BE  
DETECTED.



# How does CMS work?





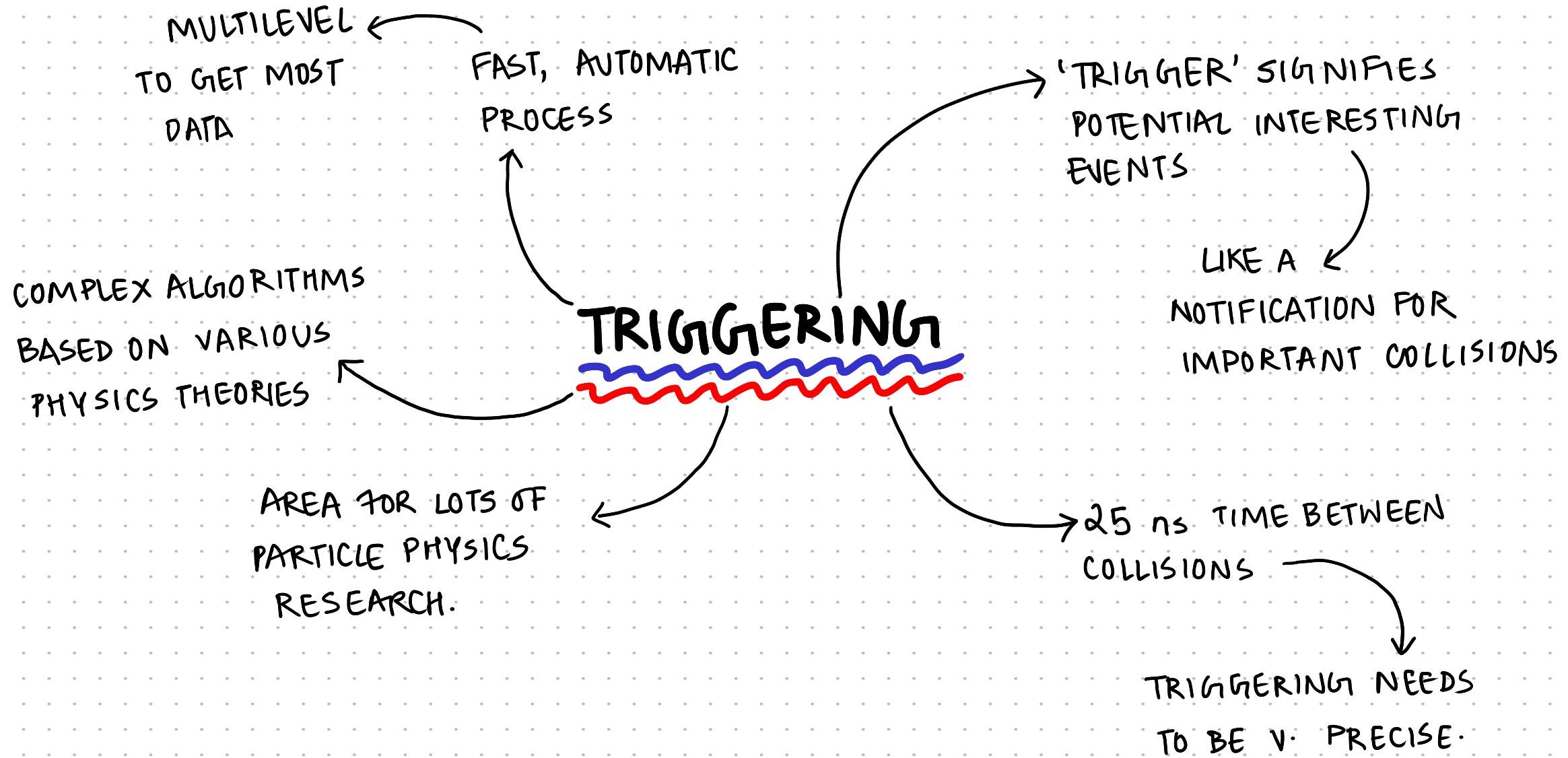


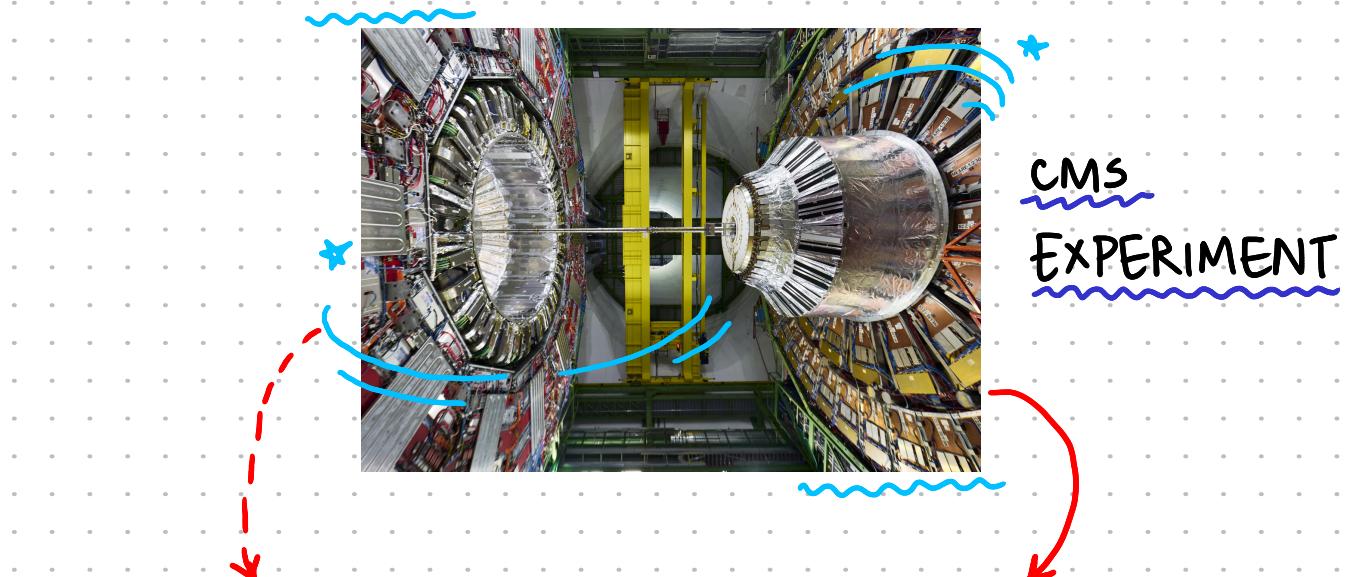
What happens after the particles  
are detected?

I bil. p-P collisions per second @ CMS!

How do we filter all this data?

Which collisions have juicy physics?





CMS  
EXPERIMENT

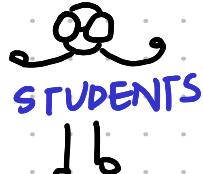
SIMULATIONS

PRIMARY DATA

CMS OPENDATA



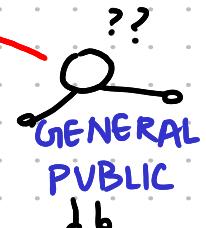
THEORISTS



STUDENTS



NON  
CERN  
SCIENTISTS



GENERAL  
PUBLIC