High-Energy Physics
Standred Model

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Inroduction :

High energy physic — is a physic about very fast particles. You smash them and look how their shards fly apart. HEP is way to see the face of the young universe. Way, to understand, how it works

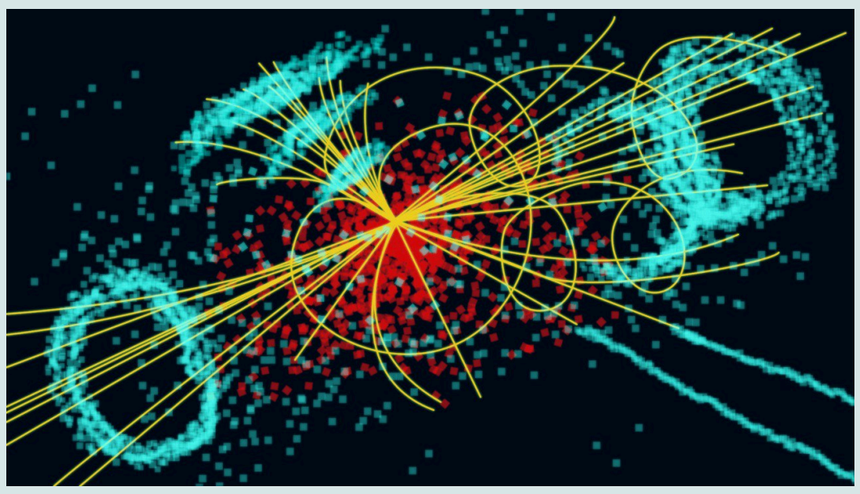


Figure 1: visualization of particles collision CERN Open Data Portal. (n.d.). https://opendata.cern.ch/visualise/events/cms#

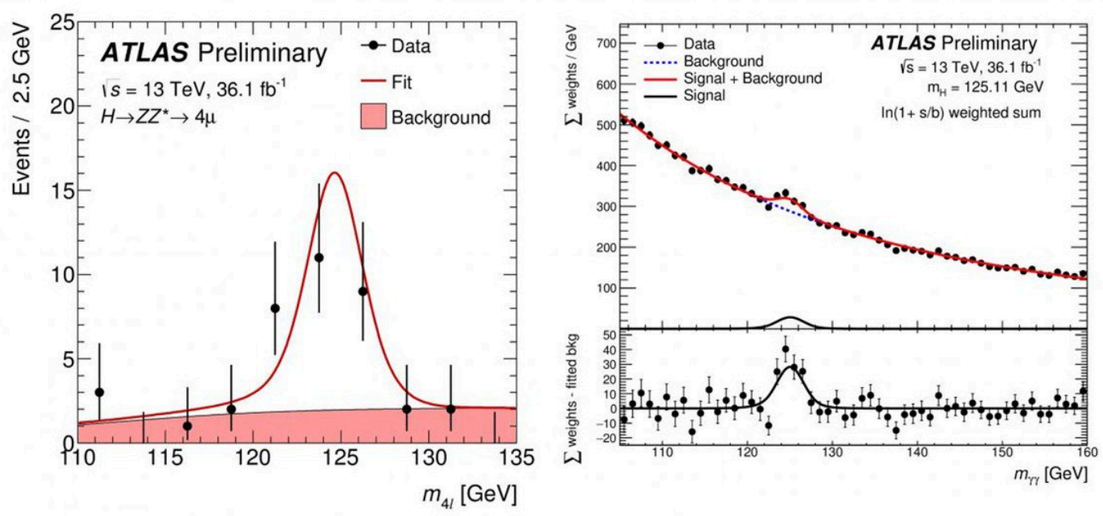
Context

Fundamental particles are the smallest "building blocks" that make up our entire universe. They participate in three fundamental interactions: strong, weak, and electromagnetic. These interactions determine the behavior of our entire world.

Methods

When high-energy particles pass through a detector, they interact with its material and leave visible traces — tiny curved paths caused by magnetic fields. By studying these tracks, scientists can identify the type of particle and measure its energy and momentum.

Results



"Based on the data collected, this table shows fundamental information about the Standard Model."

Visuliazation

PARTICLES	MATTER PARTICLES			
	Leptons		***Quarks***	
	Electron-like	*Neutrino-like*	*Up-like*	*Down-like*
Generation *1*	Electron (**e**)	Neutrino (**ν**)	Up quark (**u**)	Down quark (**d**)
Mass (Charge)	0.511 (-1)	< 3 x 10^{-6} (0)	1.5 - 4.5 (+2/3)	5 – 8.5 (-1/3)
Generation *2*	Muon (**μ**)	Muon neutrino (ν_μ)	Charm quark (**c**)	Strange quark (**s**)
Mass (Charge)	105.7 (-1)	< 0.19 (0)	1,000 – 1,400 (+2/3)	80-155 (-1/3)
Generation *3*	Tau (τ)	Tau neutrino (ν_τ)	Top quark (**t**)	Bottom quark (**b**)
Mass (Charge)	1,777 (-1)	< 18 (0)	174,000 (+2/3)	4,000 – 4,500 (-1/3)
	FORCE PARTICLES			
Field:	***Electro-magnetic***	***Strong***	***Weak***	***Higgs***
Name Mass (GeV)	Photon (γ) (0)	Gluon (**g**) (0)	W^+, W^-, W^0 (80.4; 80.4; 91.2)	Higgs (125)
Charge	-1 to +1	Eight "colors"	Isospin (+½, -½)	0

Conclusion

During our work on the Standard Model, we learned how to search for information, create presentations for presentations, and present our reports to the scientific community.
HEP is cool!

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