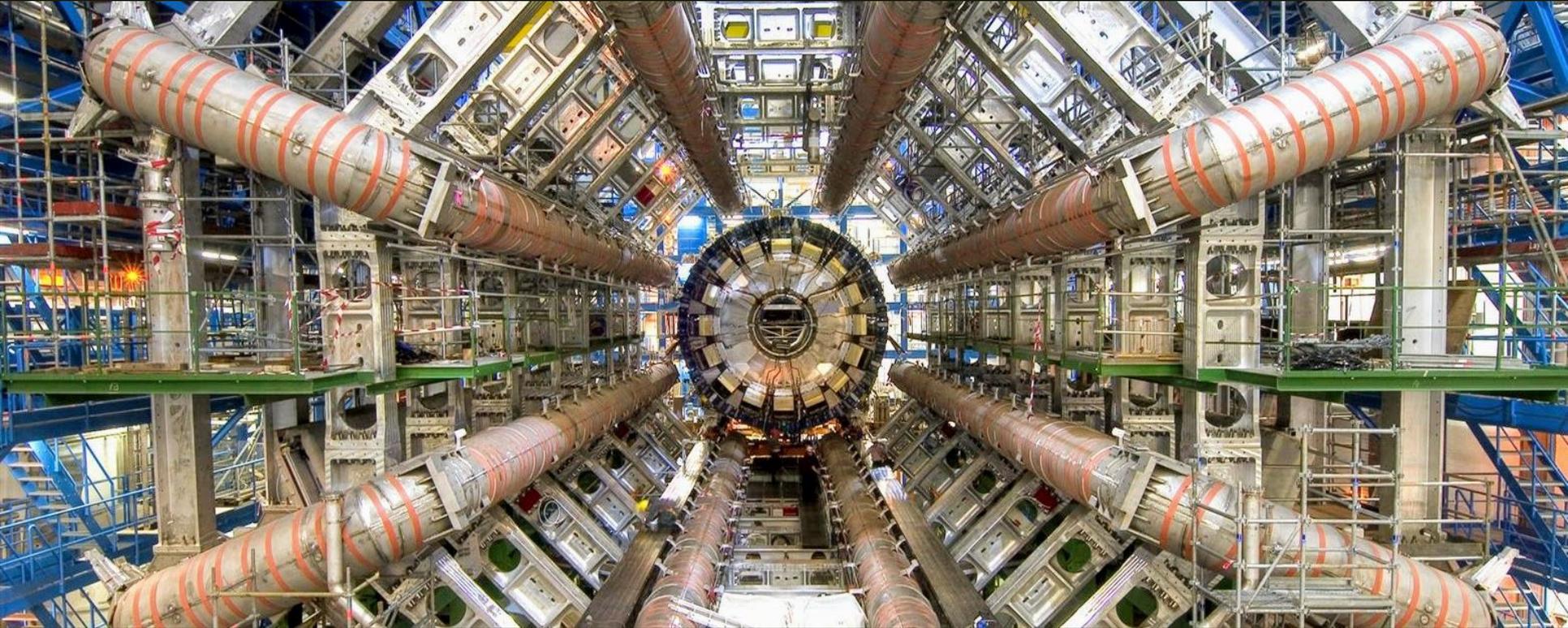


Particle Physics



All models are wrong.

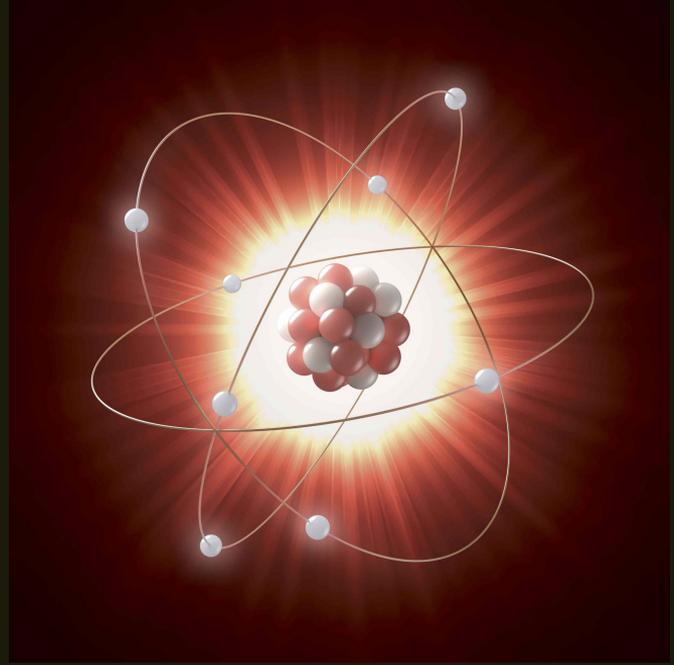
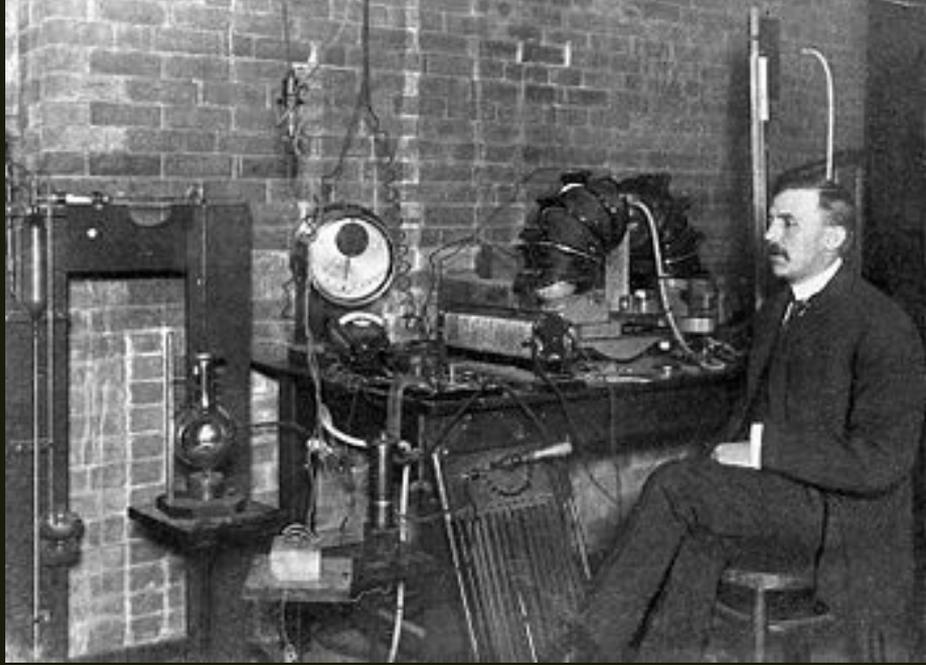
Some models are useful.

Series	Zero Group	Group I	Group II	Group III	Group IV	Group V	Group VI	Group VII	Group VIII			
0	<i>x</i>											
1		Hydrogen H=1.008										
2	Helium He=4.0	Lithium Li=7.03	Beryllium Be=9.1	Boron B=11.0	Carbon C=12.0	Nitrogen N=14.04	Oxygen O=16.00	Fluorine F=19.0				
3	Neon Ne=19.9	Sodium Na=23.05	Magnesium Mg=24.1	Aluminium Al=27.0	Silicon Si=28.4	Phosphorus P=31.0	Sulphur S=32.06	Chlorine Cl=35.45				
4	Argon Ar=38	Potassium K=39.1	Calcium Ca=40.1	Scandium Sc=44.1	Titanium Ti=48.1	Vanadium V=51.4	Chromium Cr=52.1	Manganese Mn=55.0	Iron Fe=55.9	Cobalt Co=59	Nickel Ni=59	(Cu)
5		Copper Cu=63.6	Zinc Zn=65.4	Gallium Ga=70.0	Germanium Ge=72.3	Arsenic As=75.0	Selenium Se=79	Bromine Br=79.95				
6	Krypton Kr=81.8	Rubidium Rb=85.4	Strontium Sr=87.6	Yttrium Y=89.0	Zirconium Zr=90.6	Niobium Nb=94.0	Molybdenum Mo=96.0		Ruthenium Ru=101.7	Rhodium Rh=108.0	Palladium Pd=106.5	(Ag)
7		Silver Ag=107.9	Cadmium Cd=112.4	Indium In=114.0	Tin Sn=119.0	Antimony Sb=120.0	Tellurium Te=127	Iodine I=127				
8	Xenon Xe=138	Cesium Cs=132.9	Barium Ba=137.4	Lanthanum La=139	Cerium Ce=140							(—)
9												
10				Ytterbium Yb=173		Tantalum Ta=183	Tungsten W=184		Osmium Os=191	Iridium Ir=193	Platinum Pt=194.9	(Au)
11		Gold Au=197.2	Mercury Hg=200.0	Thallium Tl=204.1	Lead Pb=206.9	Bismuth Bi=206						
12			Radium Rd=224		Thorium Th=232		Uranium U=239					

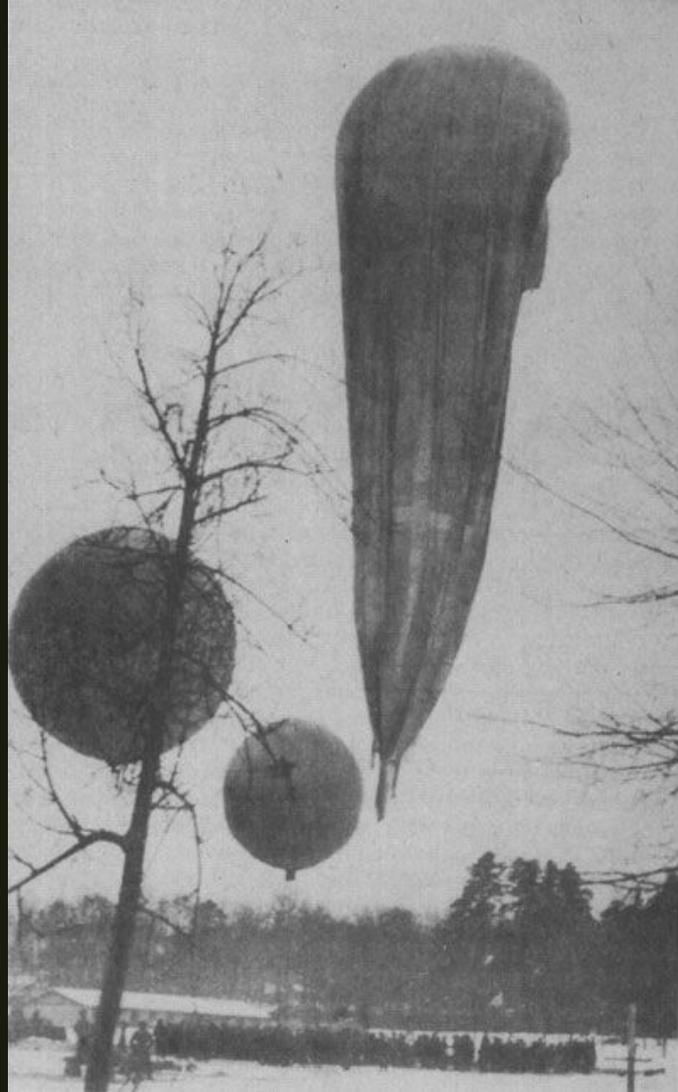
4, 5, -8, 6, -3, -1, -2, 11, -12

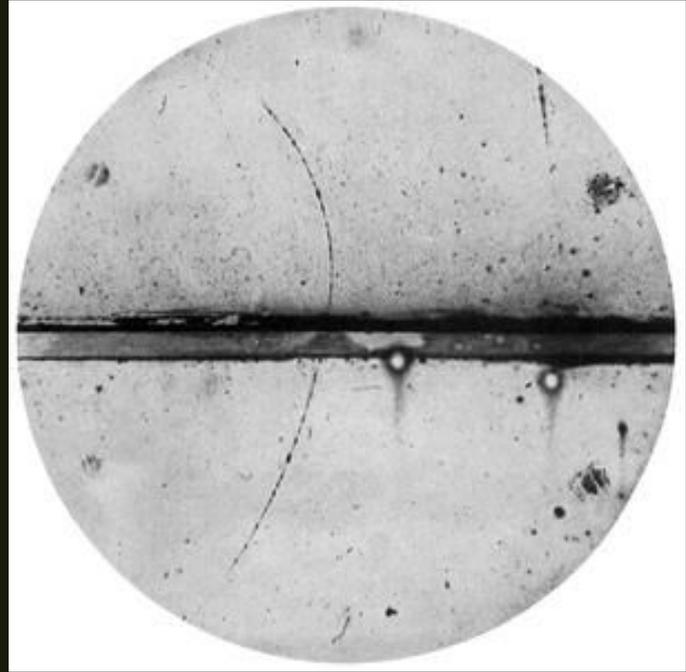
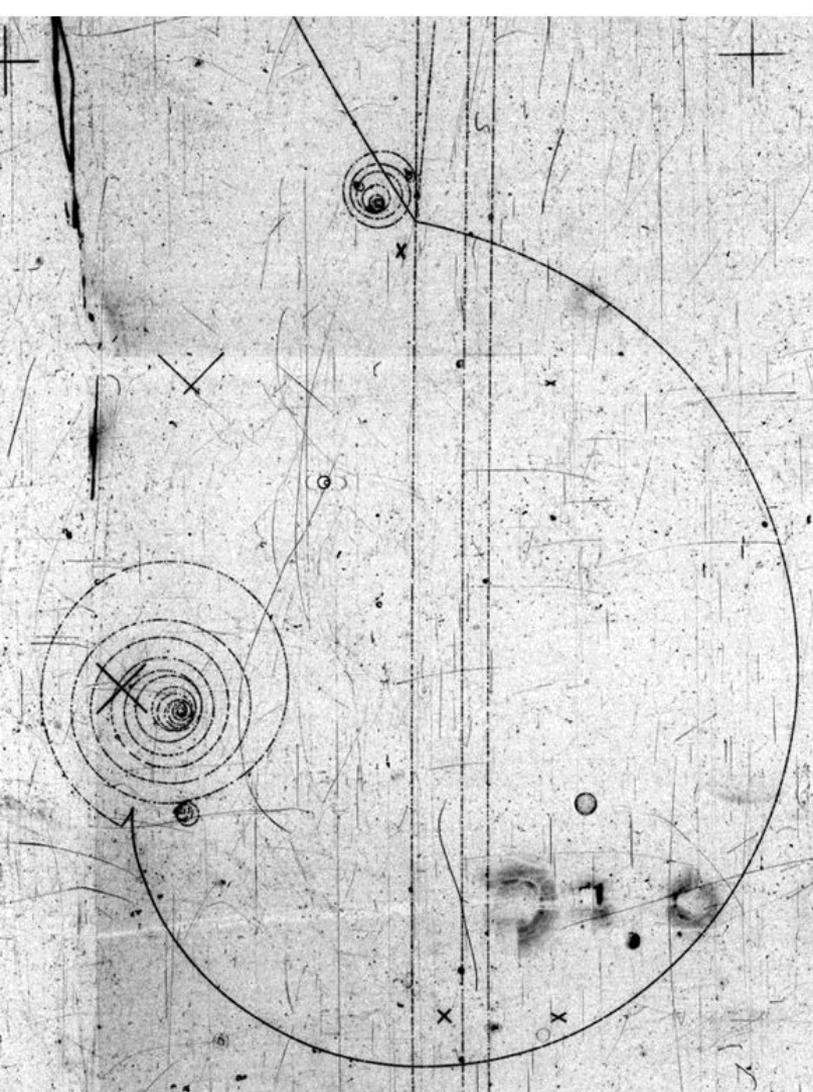
$$4 + 5 - 8 + 6 - 3 - 1 - 2 + 11 - 12 = 0$$

Series	Zero Group	Group I	Group II	Group III	Group IV	Group V	Group VI	Group VII	Group VIII					
0	<i>x</i>													
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12			Radium Ra=224		Thorium Th=232		Uranium U=239							

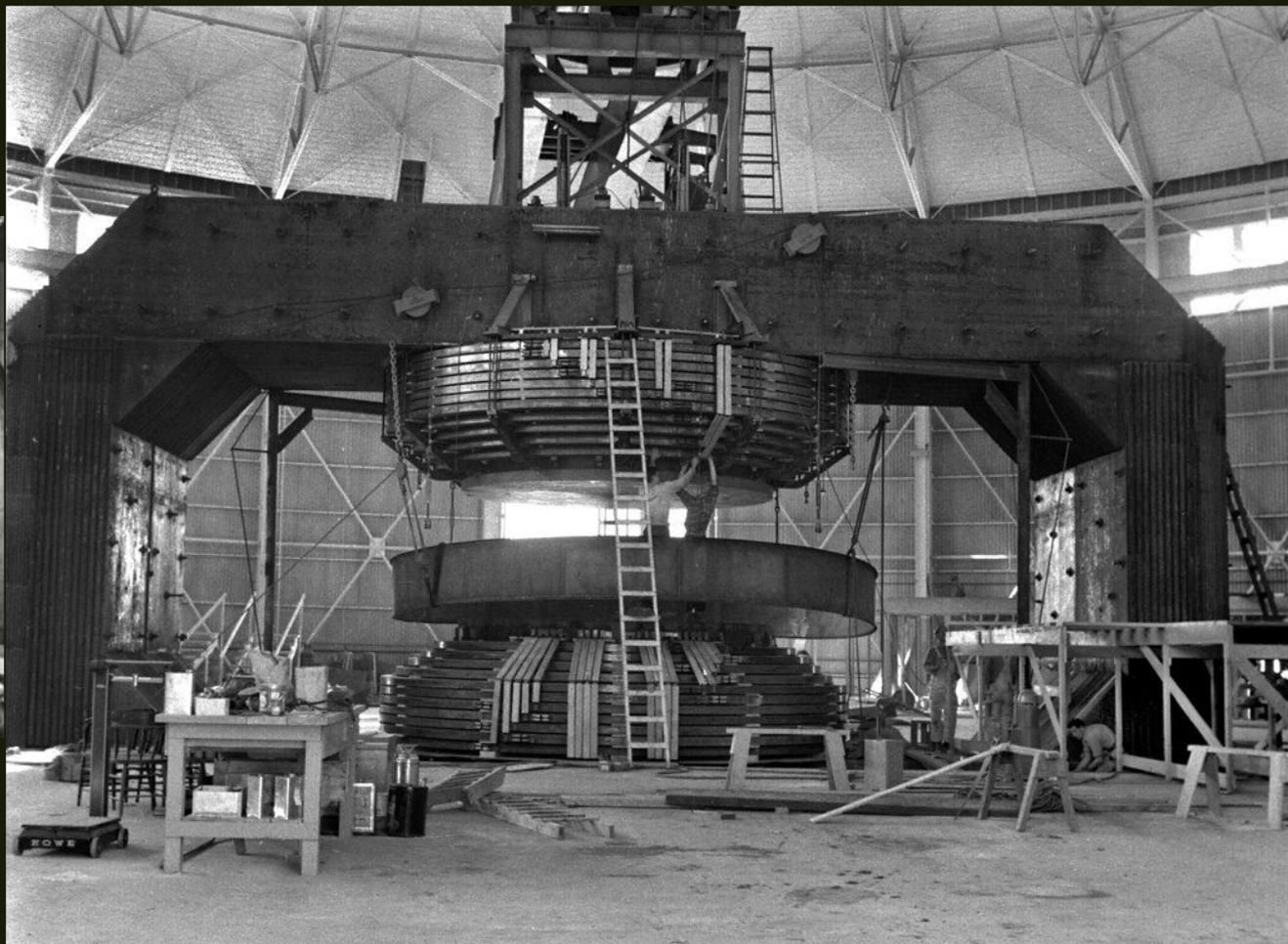
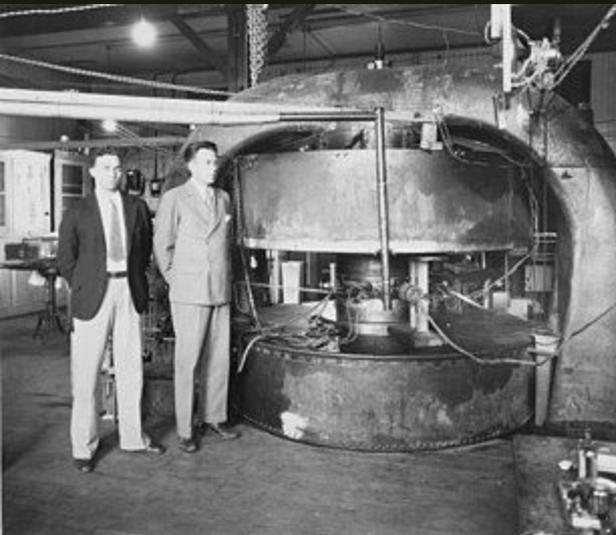




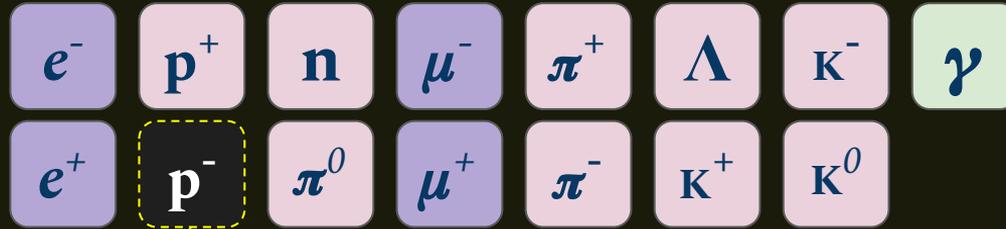






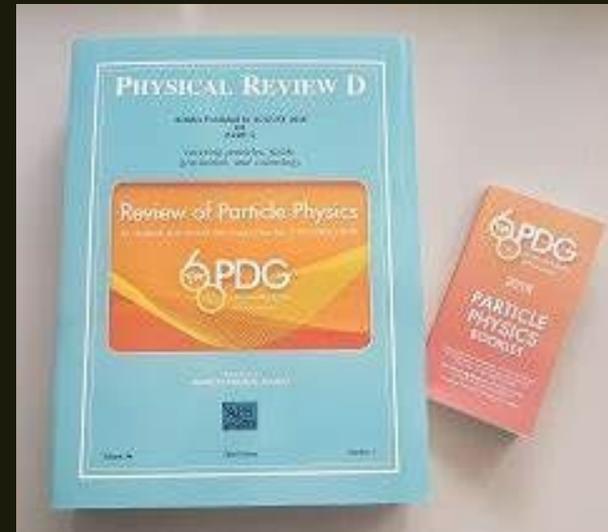


Known Subatomic Particles (1955):

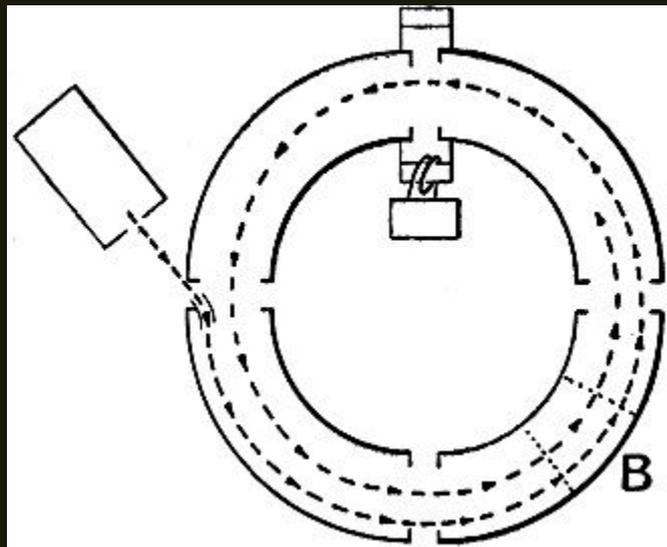
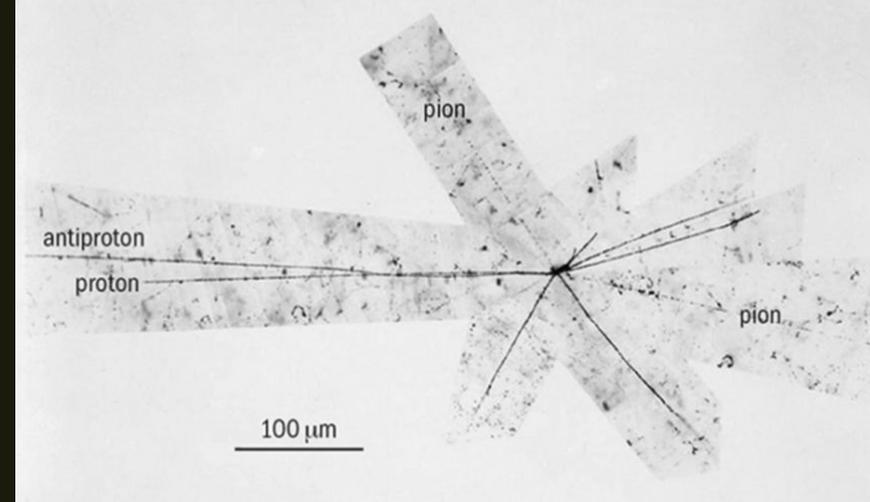
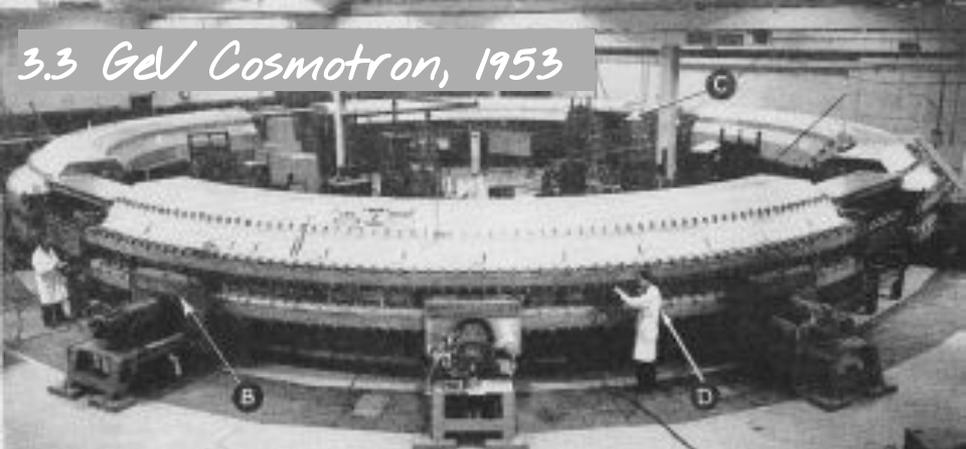


Inferred from
theory, known
mass, not yet
observed

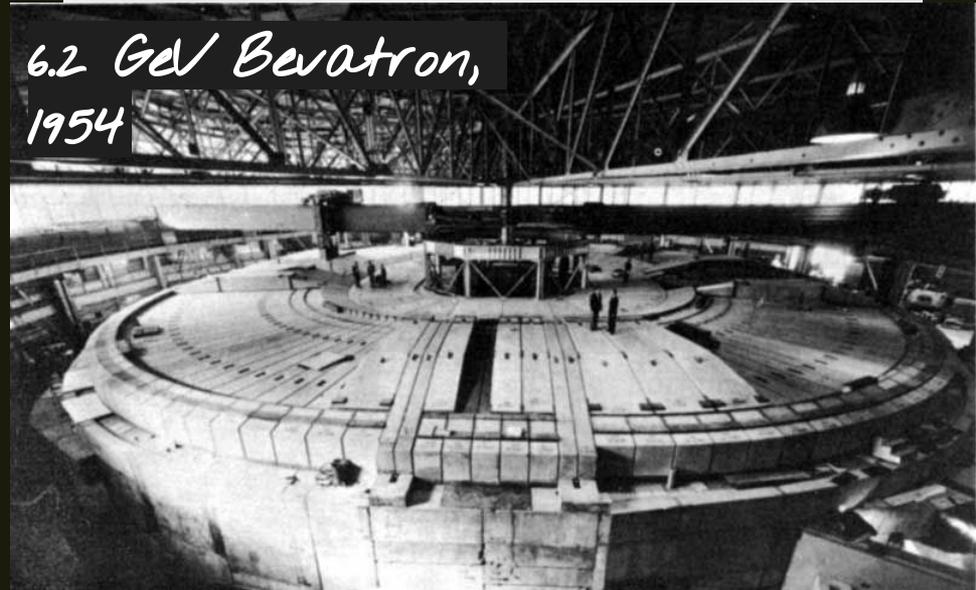
Known Subatomic Particles (2018):

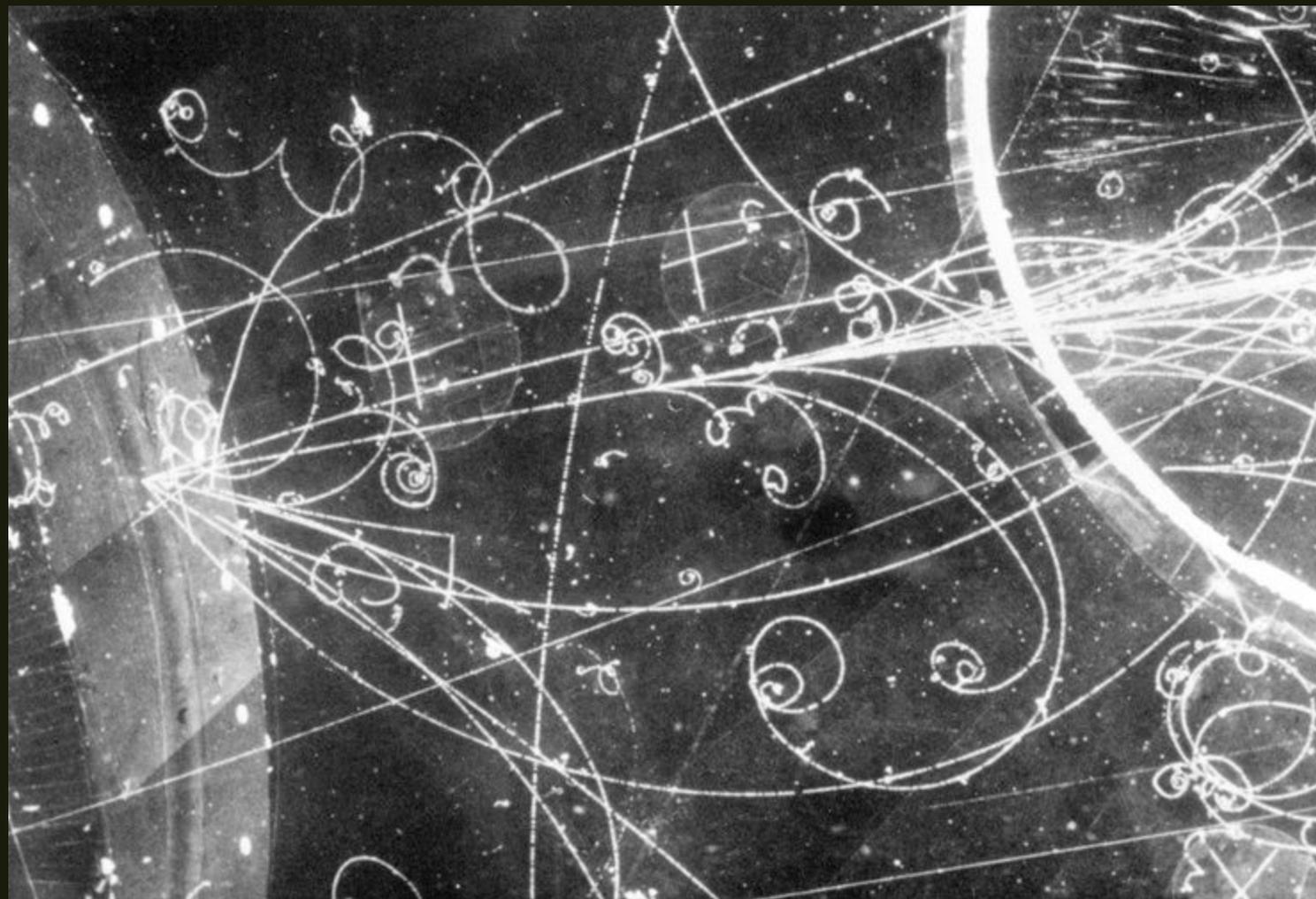


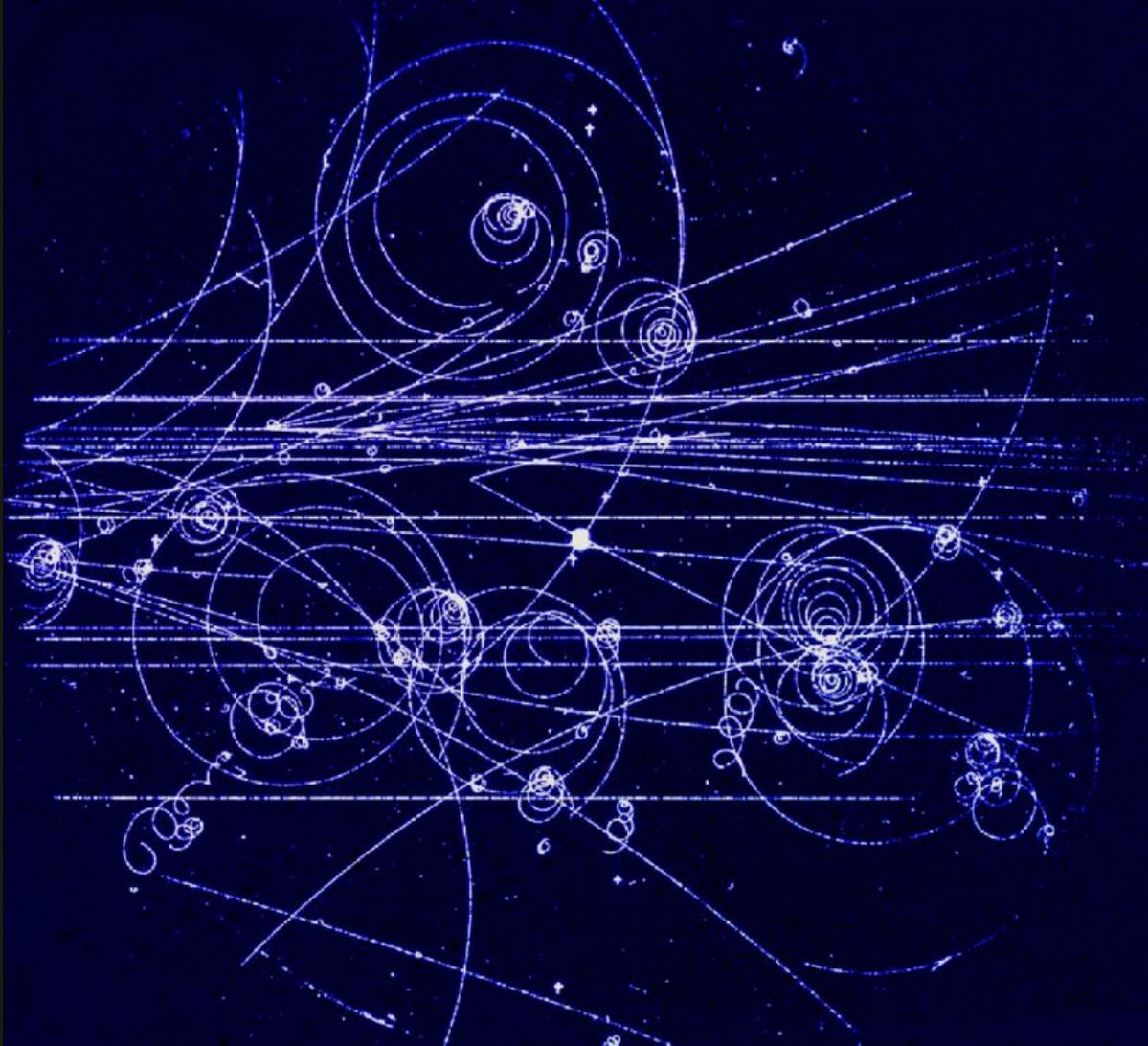
3.3 GeV Cosmotron, 1953

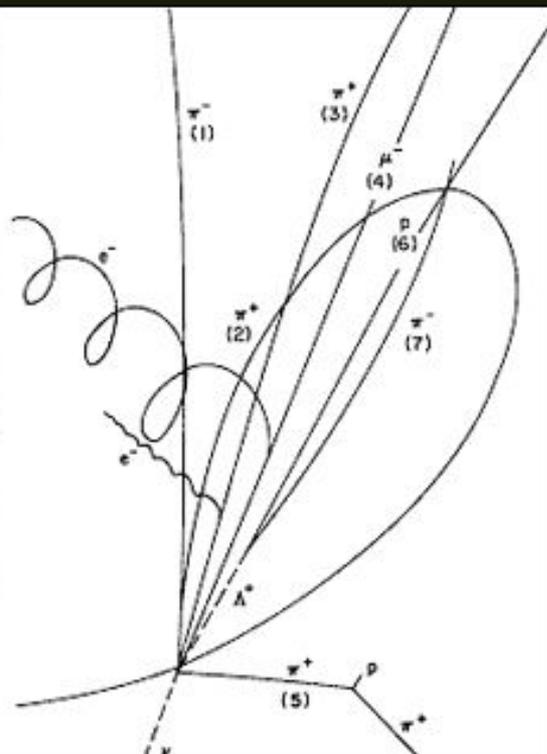
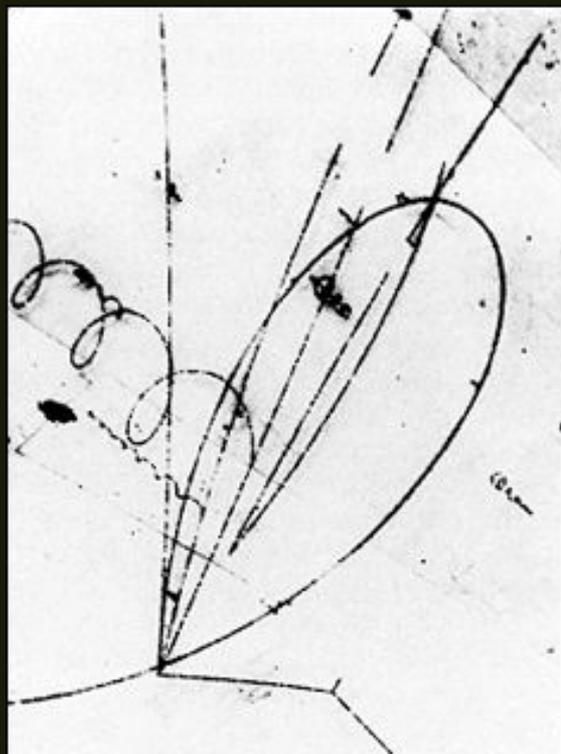


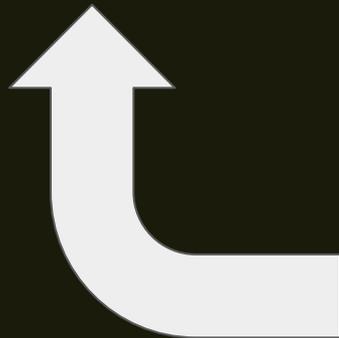
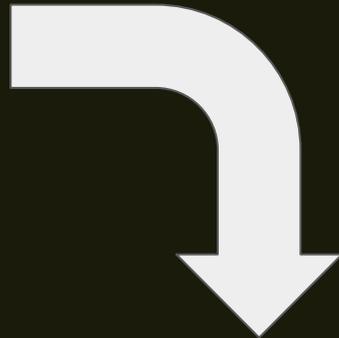
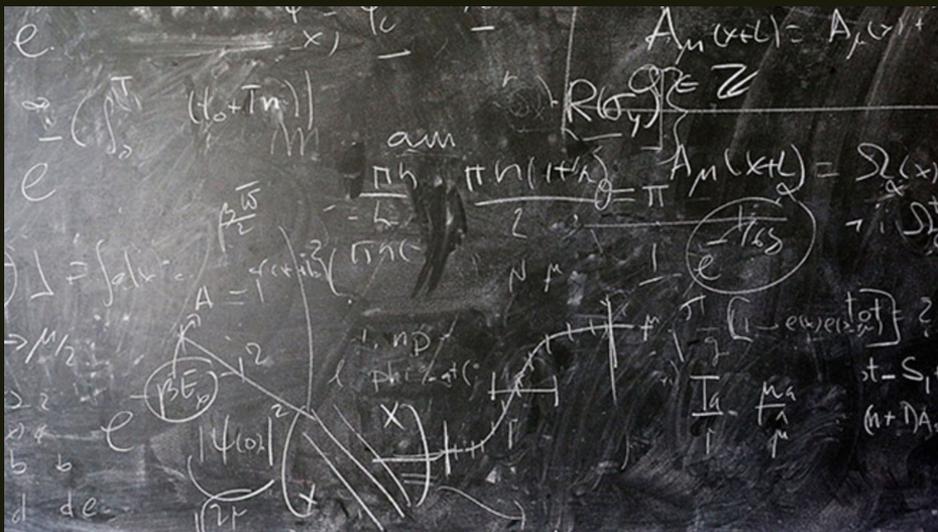
6.2 GeV Bevatron, 1954





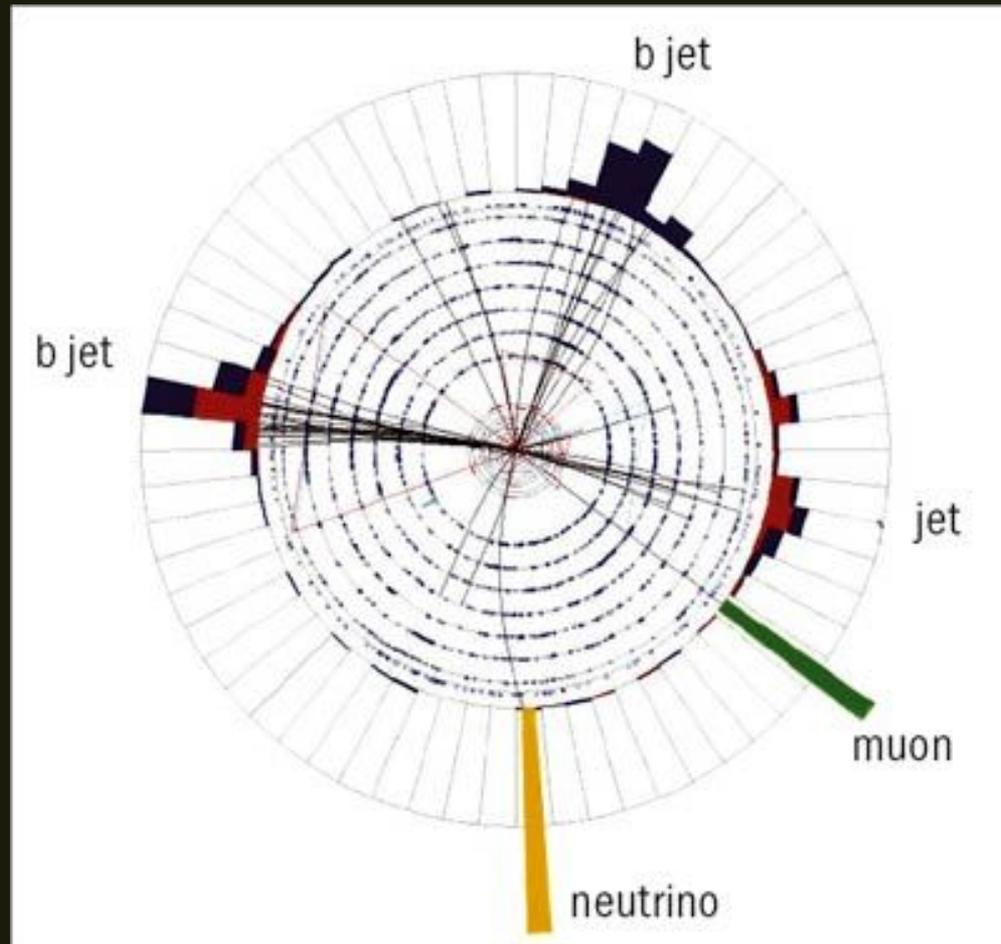




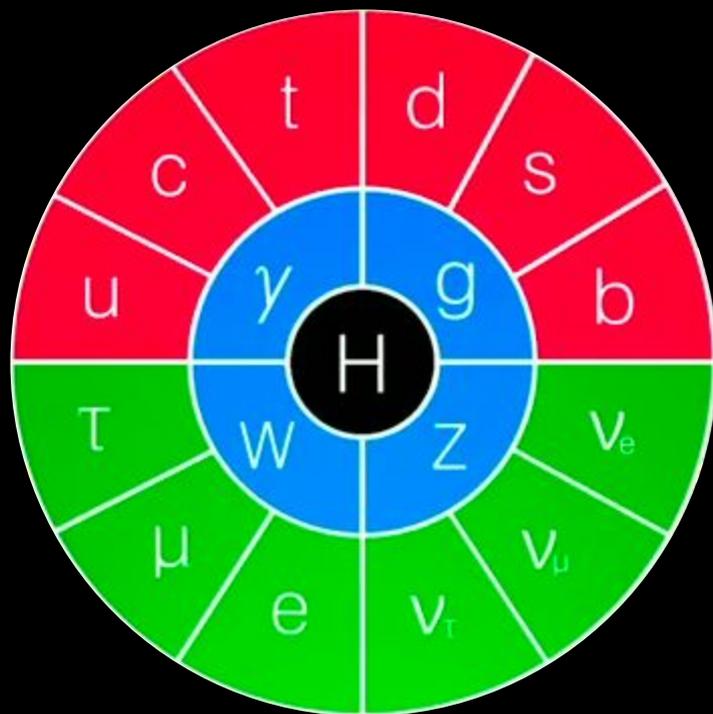


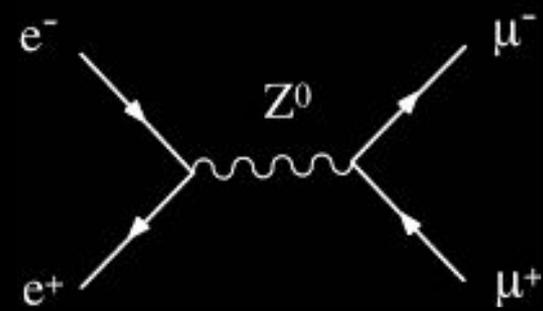
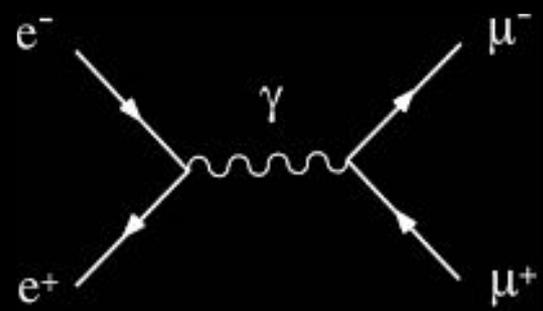


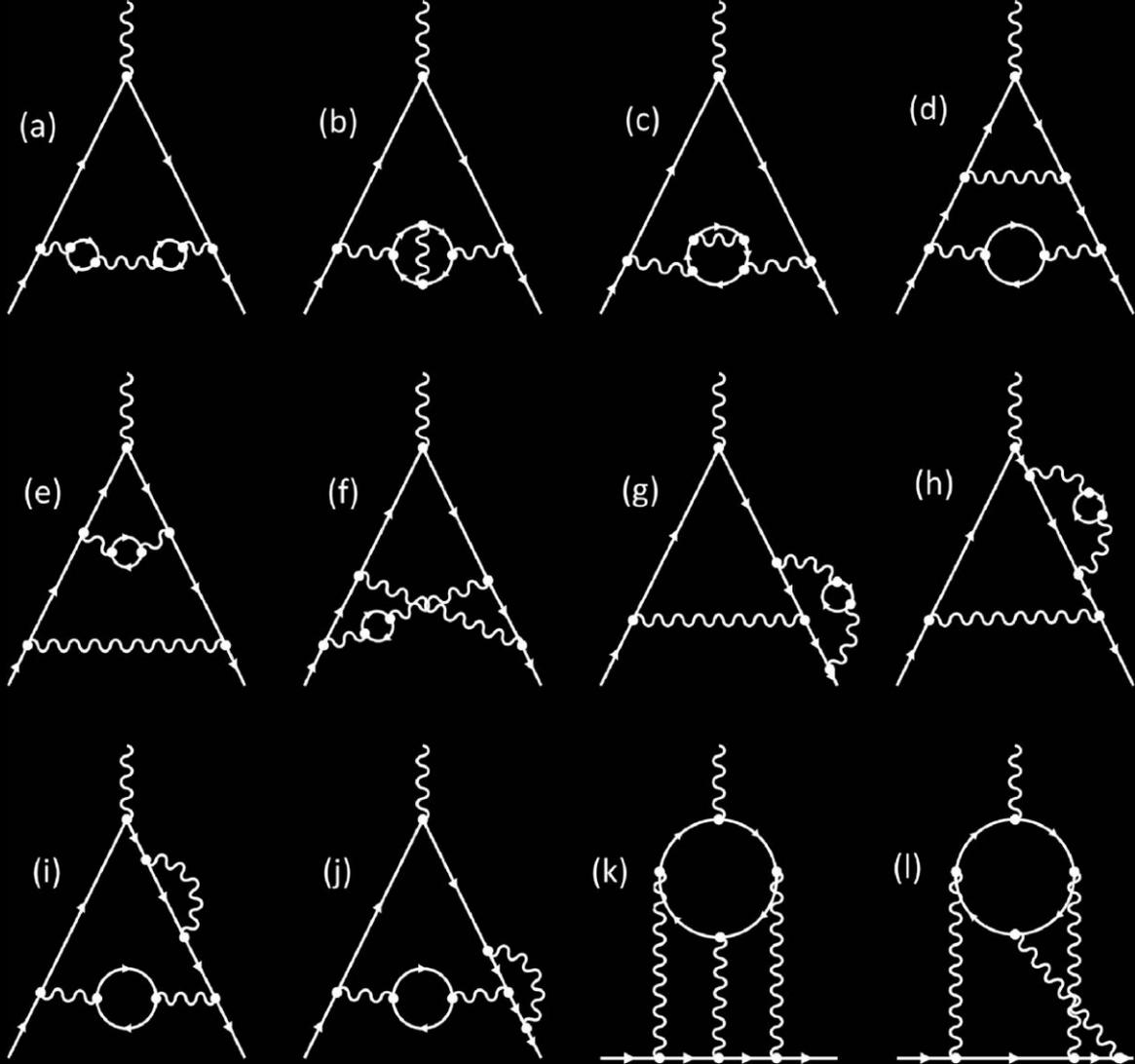
1000 GeV Tevatron, 1995



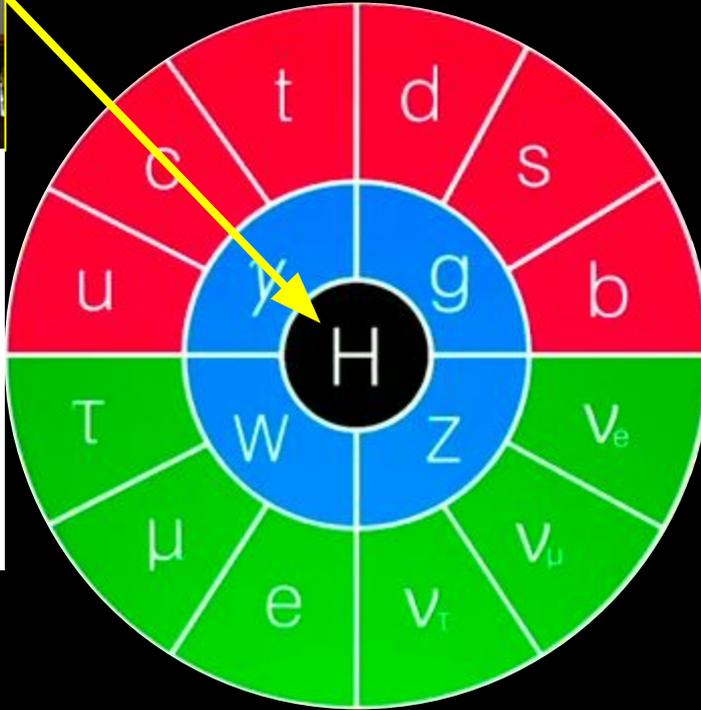
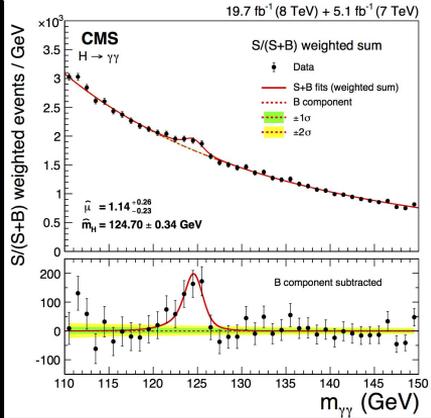
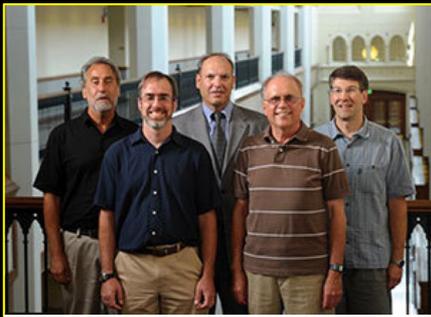
1000 GeV Tevatron, 1995



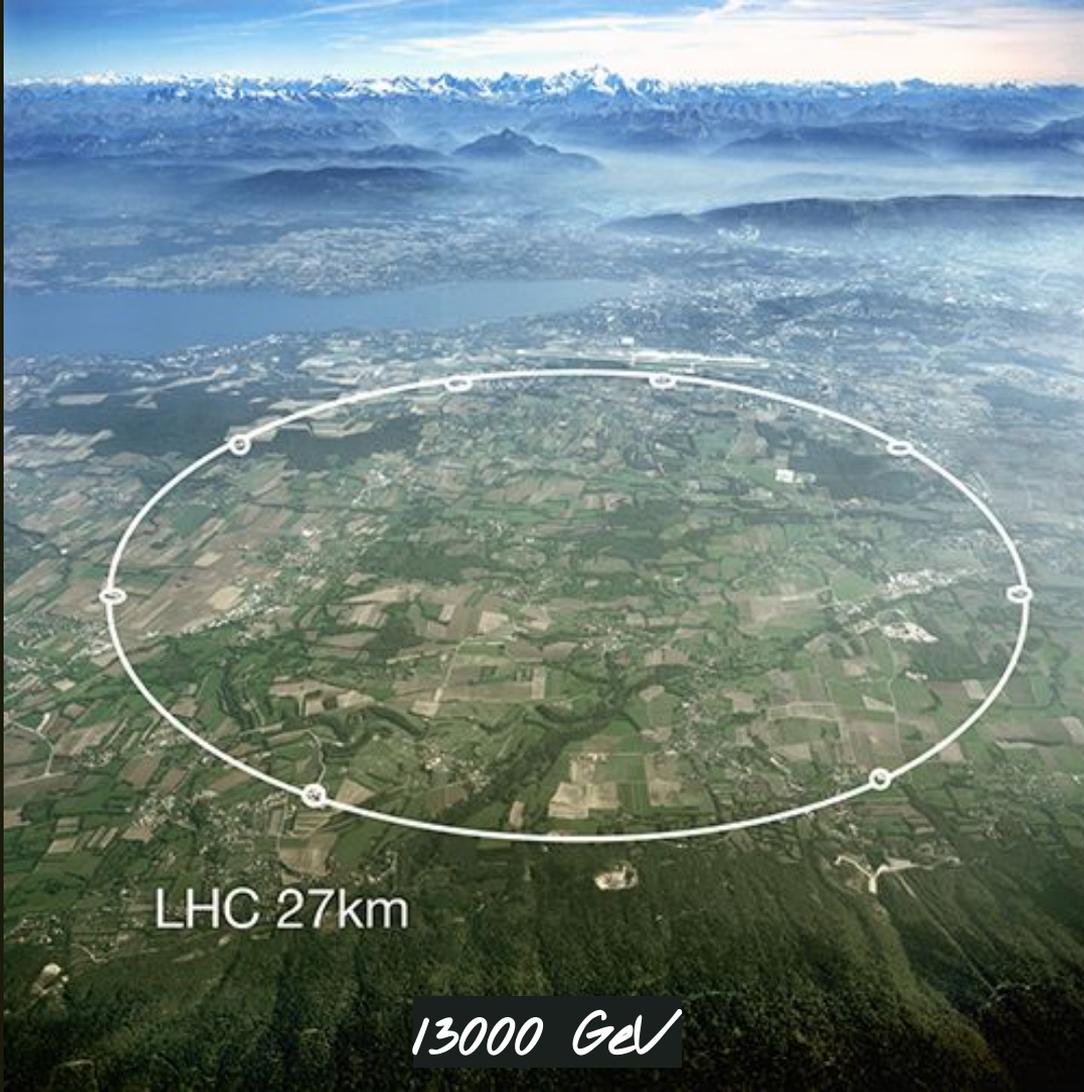




Finally
discovered
in 2011

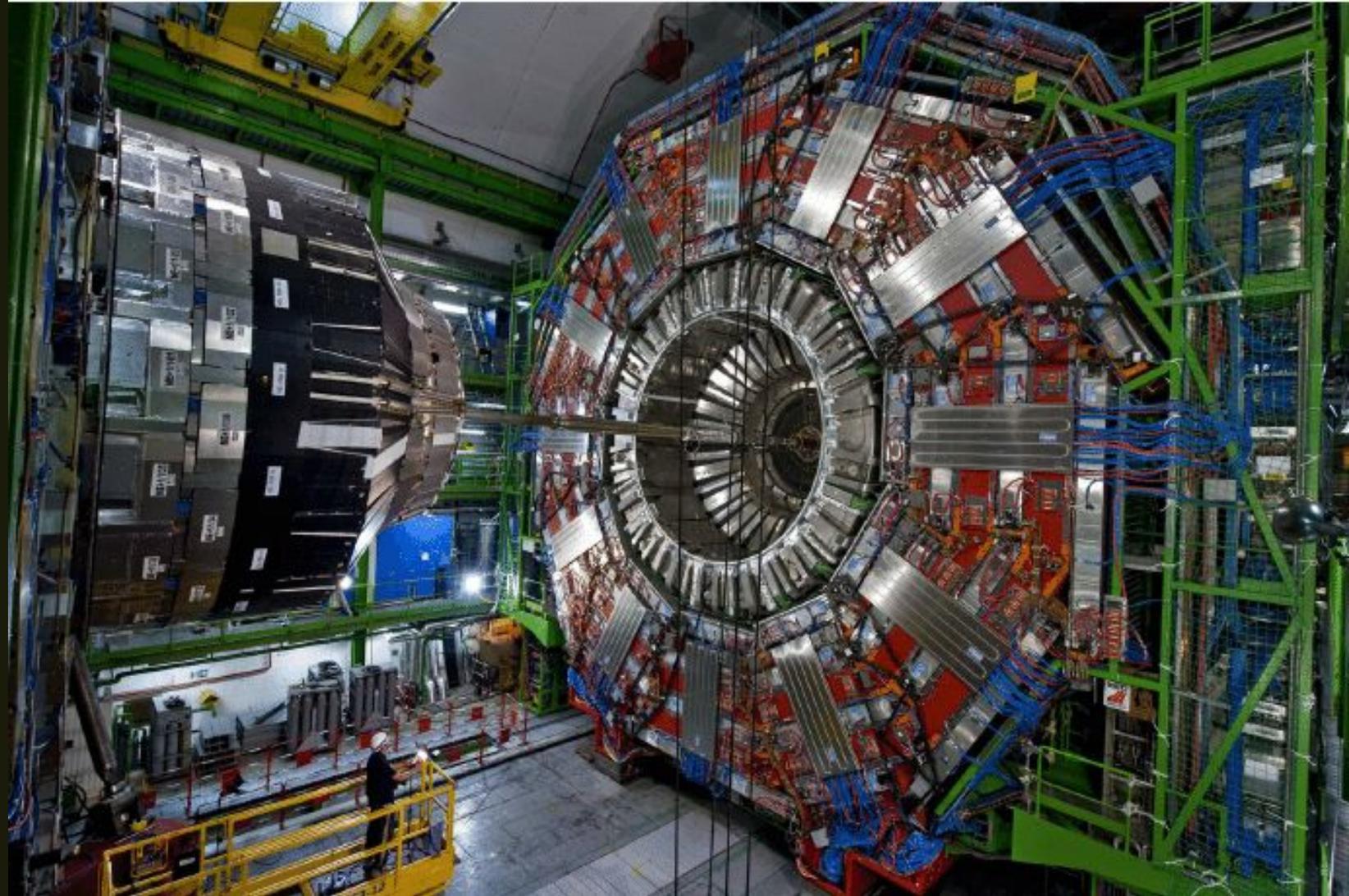


The Higgs
“completes” the
Standard Model



LHC 27km

13000 GeV

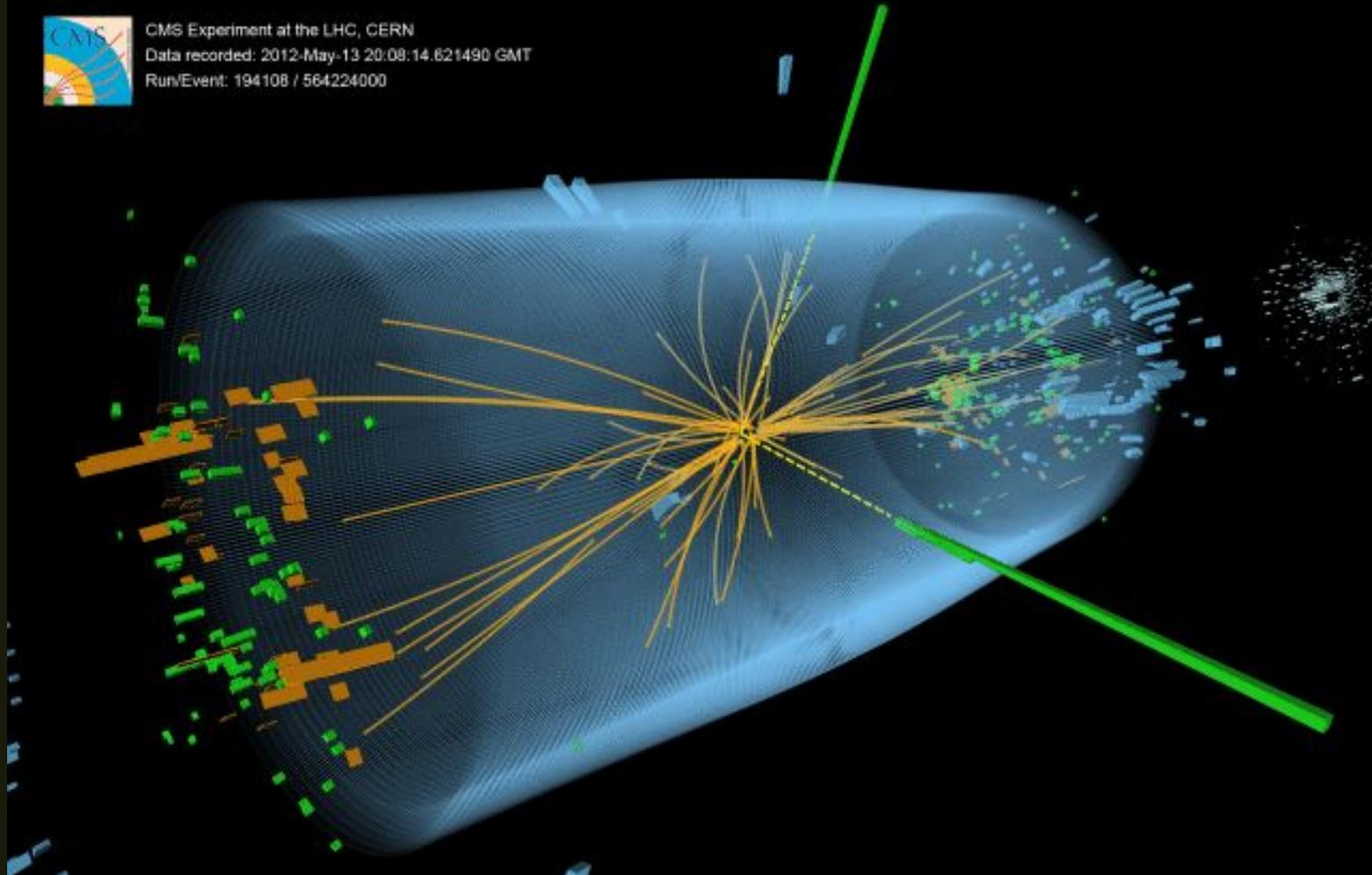




CMS Experiment at the LHC, CERN

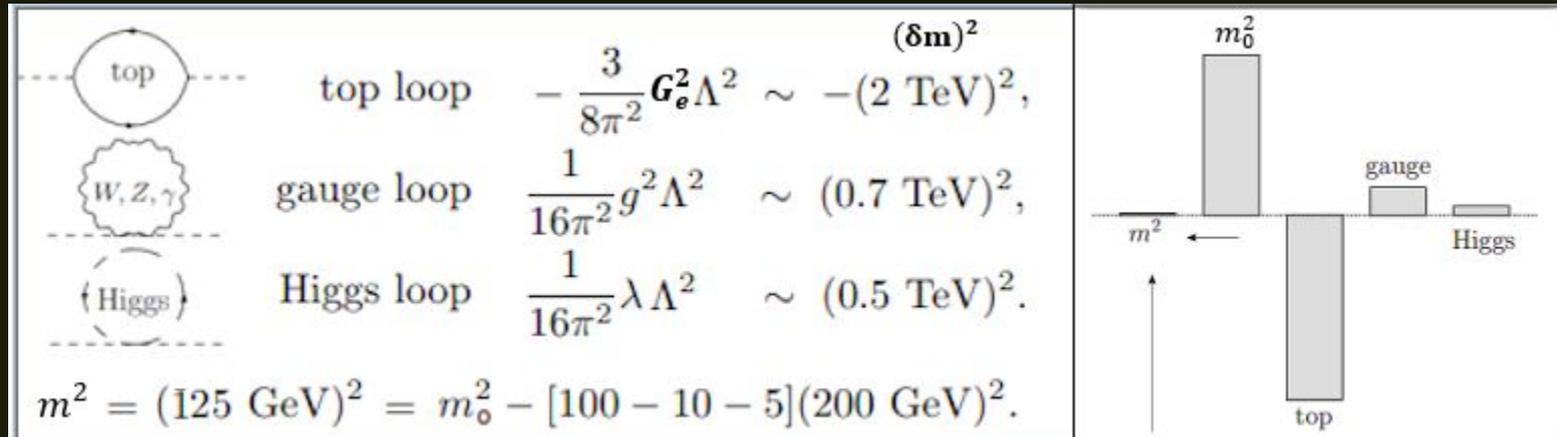
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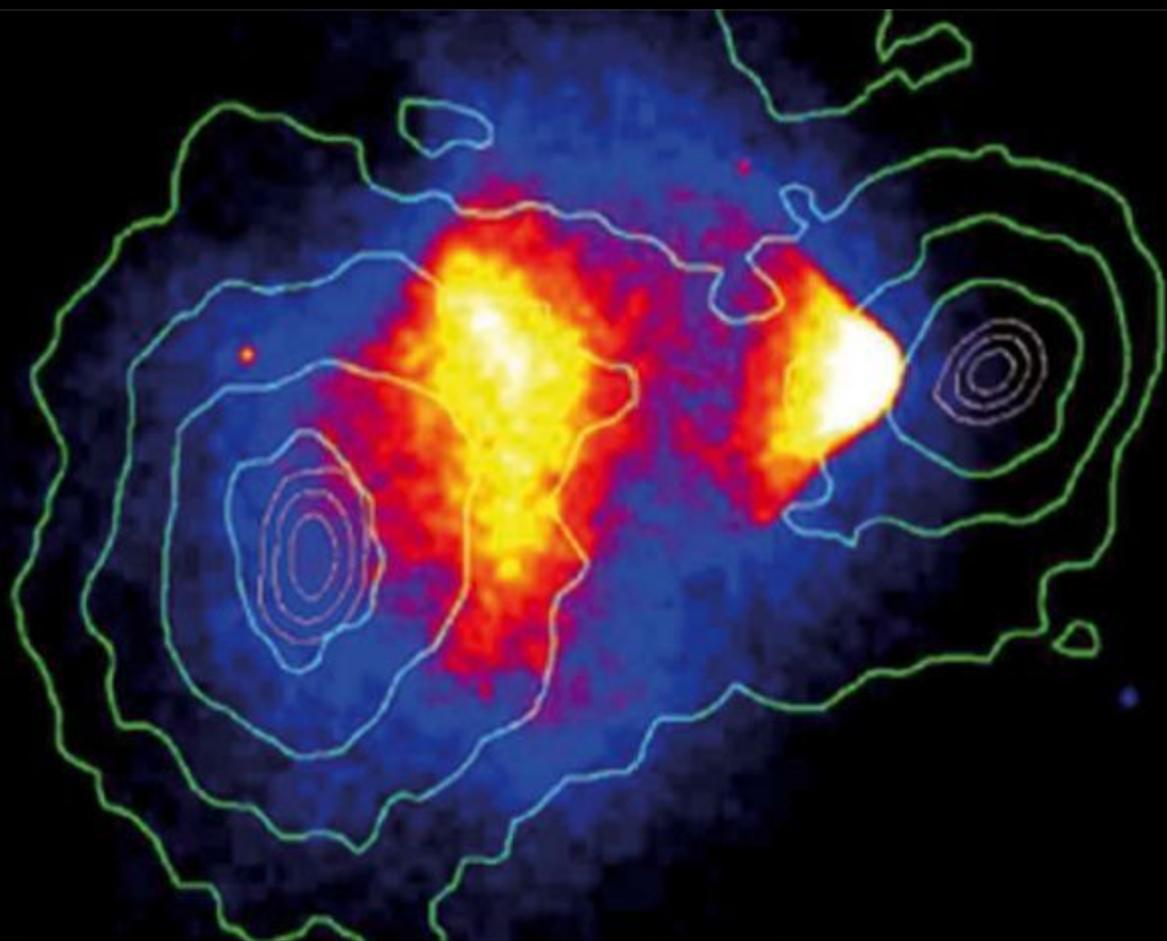
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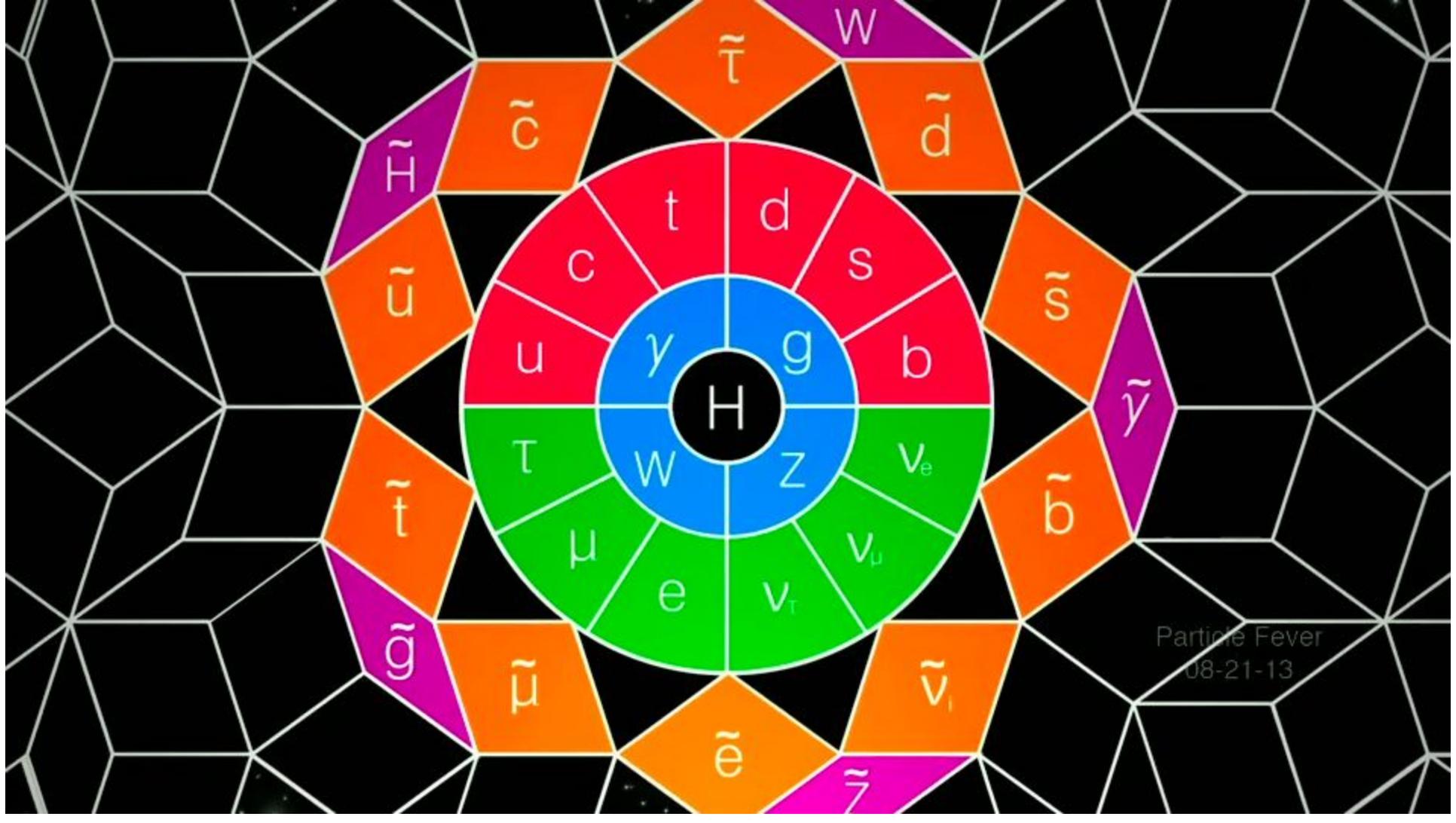


$$4 + 5 - 8 + 6 - 3 - 1 - 2 + 11 - 12 = 0$$

$$4 + 5 - 8 + 6 - 3 - 1 - 2 + 11 - 12 = 0$$







Particle Fever
08-21-13