

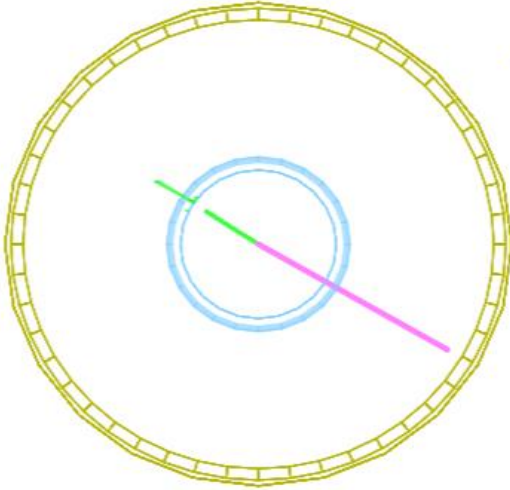


CMS WZH Masterclass “Cheat Sheet”

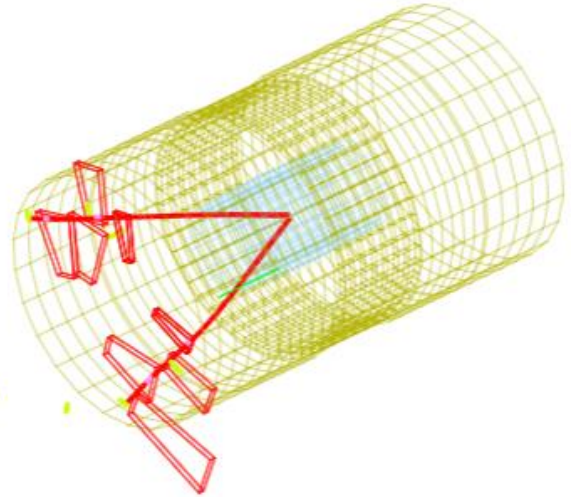


W and Z boson candidates

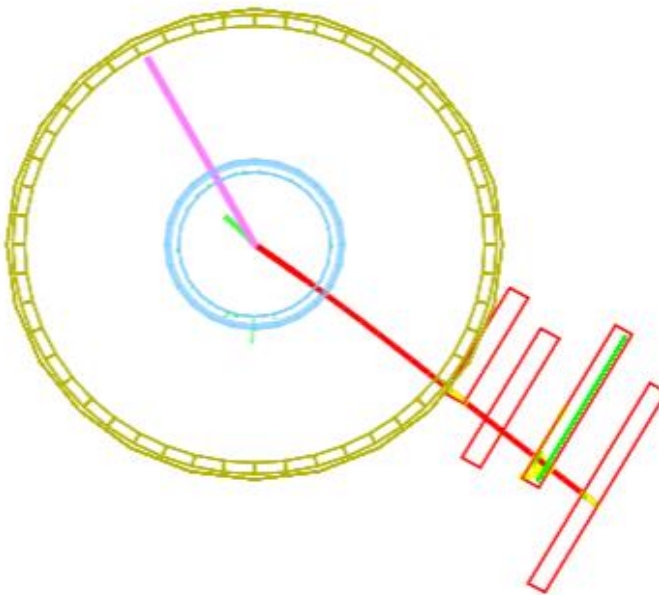
W decay to electron and neutrino:



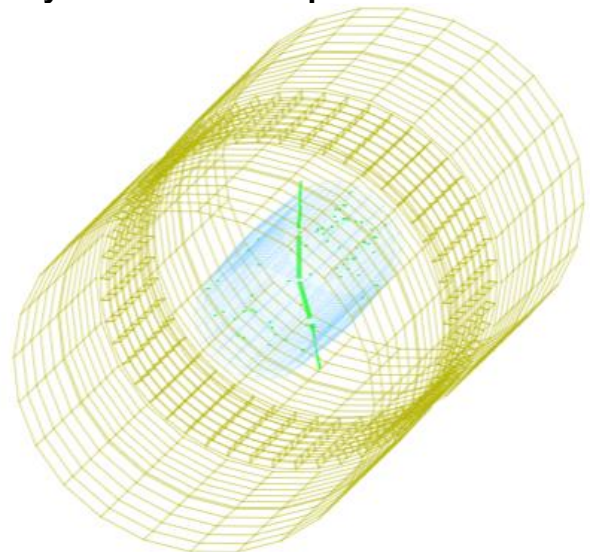
Z decay to muon and anti-muon:



W decay to muon and neutrino:



Z decay to electron and positron:



Notes on decays:

- *W decays have missing E_t (usually >20 GeV) and one visible lepton track.*
- *Z decays can show some missing E_t (usually <20 GeV) or none and have 2 visible lepton tracks.*
- *Both W and Z decays can have “extra” tracks which confound quick analysis – but a “good guess” can sometimes be made.*

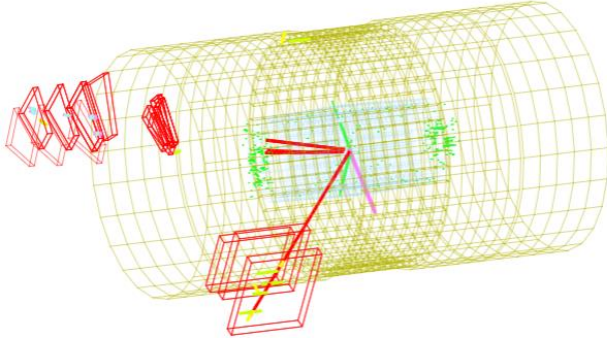


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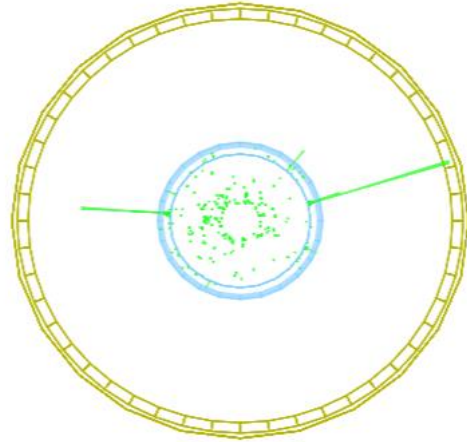


Higgs boson candidates

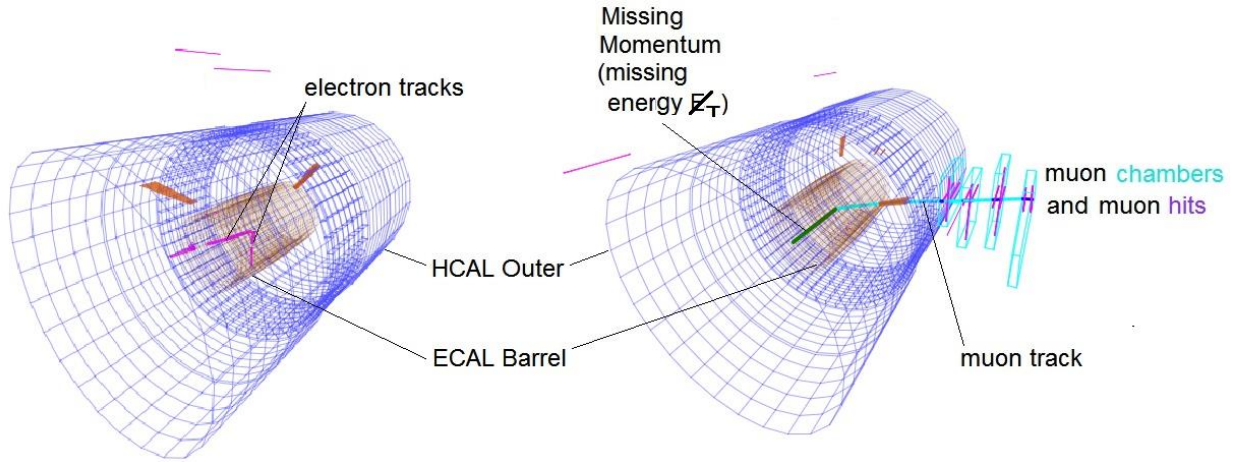
Higgs decay to two Z bosons:



Higgs decay to two photons:



Useful background on WZH Masterclass events



Elements of events from iSpy-online (false colors)

mass →	≈2.3 MeV/c ²	≈1.275 GeV/c ²	≈173.07 GeV/c ²	0	≈126 GeV/c ²
charge →	2/3	2/3	2/3	0	0
spin →	1/2	1/2	1/2	1	0
	u up	c charm	t top	g gluon	H Higgs boson
QUARKS	≈4.8 MeV/c ²	≈95 MeV/c ²	≈4.18 GeV/c ²	0	
	-1/3	-1/3	-1/3	0	
	1/2	1/2	1/2	1	
	d down	s strange	b bottom	γ photon	
	0.511 MeV/c ²	105.7 MeV/c ²	1.777 GeV/c ²	91.2 GeV/c ²	
	-1	-1	-1	0	
	1/2	1/2	1/2	1	
	e electron	μ muon	τ tau	Z Z boson	
LEPTONS	<2.2 eV/c ²	<0.17 MeV/c ²	<15.5 MeV/c ²	80.4 GeV/c ²	
	0	0	0	±1	
	1/2	1/2	1/2	1	
	ν_e electron neutrino	ν_μ muon neutrino	ν_τ tau neutrino	W W boson	
					GAUGE BOSONS

Particles in the standard model