Exploring about the 4 possible decay modes of Xi_c

Focused decay modes,

Xi_c+ → Xi0 mu+ nu_mu
Xi_c+ → Xi0 e+ nu_mu
Xi_c0 → Xi- mu+ nu_e
Xi_c0 → Xi- e+ nu_e

1) Event generation

```
ge.add_inclusive_continuum_generator(finalstate="ccbar",
                                     particles=["Xi_c+","Xi_c0"],
                                     userdecfile="Xic.dec",
                                     path=my_path)
```

2) Decay file

```
Decay Xi_c+
1.0 Xi0 mu+ nu_mu  PHSP;
1.0 Xi0 e+ nu_e  PHSP;
Enddecay

Decay anti-Xi_c-
1.0 anti-Xi0 mu- anti-nu_mu  PHSP;
1.0 anti-Xi0 e- anti-nu_e  PHSP;
Enddecay

Decay Xi_c0
1.0 Xi- mu+ nu_mu PHSP;
1.0 Xi- e+ nu_e PHSP;
Enddecay


Decay anti-Xi_c0
1.0 anti-Xi+ mu- anti-nu_mu PHSP;
1.0 anti-Xi+ e- anti-nu_e PHSP;
Enddecay
```

3) Reconstruction

Particle	**Decays to**	**Cut string**
Lambda0	p+ pi-	1.1 < M < 1.13
Xi0	Lambda0 pi0	1.2 < M < 1.43

Xi_c+	Xi0	mu+	2.3 < M < 2.6
Xi_c+	Xi0	e+	2.3 < M < 2.6
Xi-	Lambda0	pi-	1.25 < M < 1.45
Xi_c0	Xi-	mu+	2.3 < M < 2.6
Xi_c0	Xi-	e+	2.3 < M < 2.6

```
# reconstruct Lambda0 -> p+ pi-
ma.reconstructDecay(decayString='Lambda0:ppi -> p+:good
pi-:loose', cut='1.1 < M < 1.13', path=my_path)

# reconstruct Xi0 -> Lambda0 pi0
ma.reconstructDecay(decayString='Xi0:pp2 -> Lambda0:ppi  pi0:all',
cut='1.2 < M < 1.43', path=my_path)

# reconstruct Xi_c+ -> Xi0 mu+ (nu_mu)
ma.reconstructDecay(decayString='Xi_c+:ximup -> Xi0:pp2 mu+:good',
cut='2.3 < M < 2.6',dmID=0, path=my_path)

ma.reconstructDecay(decayString='anti-Xi_c-:ximum -> anti-Xi0:pp2
mu-:good', cut='2.3 < M < 2.6',dmID=1, path=my_path)

# reconstruct Xi_c+ -> Xi0 e+ (nu_mu)
ma.reconstructDecay(decayString='Xi_c+:xiep -> Xi0:pp2 e+:good',
cut='2.3 < M < 2.6',dmID=2, path=my_path)

ma.reconstructDecay(decayString='anti-Xi_c-:xiem -> anti-Xi0:pp2
e-:good', cut='2.3 < M < 2.6',dmID=3, path=my_path)



# reconstruct Xi- -> Lambda0 pi-
ma.reconstructDecay(decayString='Xi-:xim -> Lambda0:ppi  pi-:all',
cut='1.25 < M < 1.45', path=my_path)

# reconstruct Xi+ -> Lambda0 pi+
ma.reconstructDecay(decayString='anti-Xi+:xip -> anti-Lambda0:ppi
pi+:all', cut='1.25 < M < 1.45', path=my_path)

# reconstruct Xi_c0 -> Xi- mu+ (nu_e)
ma.reconstructDecay(decayString='Xi_c0:ximmup -> Xi-:xim
mu+:good', cut='2.3 < M < 2.6',dmID=4, path=my_path)

ma.reconstructDecay(decayString='anti-Xi_c0:xipmum -> anti-Xi+:xim
mu-:good', cut='2.3 < M < 2.6',dmID=5, path=my_path)

# reconstruct Xi_c0 -> Xi- e+ (nu_e)
ma.reconstructDecay(decayString='Xi_c0:ximep -> Xi-:xip e+:good',
cut='2.3 < M < 2.6',dmID=6, path=my_path)
```

```
ma.reconstructDecay(decayString='anti-Xi_c0:xipem -> anti-Xi+:xip
e-:good', cut='2.3 < M < 2.6',dmID=7, path=my_path)
```

Resulting table for 100 events

Name	Calls	Memory(MB)	Time(s)	Time(ms)/Call
RootInput	101	0	0.08	0.82 +- 0.25
ProgressBar	100	0	0.00	0.03 +- 0.07
ParticleLoader_pi+:all	100	74	3.13	31.27 +- 307.33
ParticleLoader_pi+:loose	100	1	0.07	0.68 +- 2.40
ParticleLoader_p+:good	100	0	0.03	0.34 +- 0.11
ParticleLoader_mu+:good	100	0	0.03	0.35 +- 0.11
ParticleLoader_e+:good	100	0	0.03	0.34 +- 0.11
ParticleLoader_gamma:all	100	0	0.04	0.43 +- 0.12
ParticleCombiner_pi0:all -> gamma:all gamma:all	100	0	0.08	0.83 +- 0.53
MCMatch_pi0:all	100	0	0.07	0.72 +- 0.48
ParticleCombiner_Lambda0:ppi -> p+:good pi-:loose	100	0	0.00	0.04 +- 0.01
ParticleCombiner_Xi0:pp2 -> Lambda0:ppi pi0:all	100	0	0.00	0.05 +- 0.08
ParticleCombiner_Xi_c+:ximup -> Xi0:pp2 mu+:good	100	0	0.00	0.03 +- 0.02
ParticleCombiner_anti-Xi_c-:ximum -> anti-Xi0:pp2 mu-:good	100	0	0.00	0.03 +- 0.02
ParticleCombiner_Xi_c+:xiep -> Xi0:pp2 e+:good	100	0	0.00	0.03 +- 0.01
ParticleCombiner_anti-Xi_c-:xiem -> anti-Xi0:pp2 e-:good	100	0	0.00	0.03 +- 0.00
ParticleCombiner_Xi-:xim -> Lambda0:ppi pi-:all	100	0	0.00	0.03 +- 0.00
ParticleCombiner_anti-Xi+:xip -> anti-Lambda0:ppi pi+:all	100	0	0.00	0.03 +- 0.00
ParticleCombiner_Xi_c0:ximmup -> Xi-:xim mu+:good	100	0	0.00	0.03 +- 0.00
ParticleCombiner_anti-Xi_c0:xipmum -> anti-Xi+:xim mu-:good	100	0	0.00	0.03 +- 0.00
ParticleCombiner_Xi_c0:ximep -> Xi-:xip e+:good	100	0	0.00	0.03 +- 0.00
ParticleCombiner_anti-Xi_c0:xipem -> anti-Xi+:xip e-:good	100	0	0.00	0.03 +- 0.00
MCMatch_Xi_c+:ximup	100	0	0.00	0.02 +- 0.00
MCMatch_anti-Xi_c-:ximum	100	0	0.00	0.02 +- 0.00
MCMatch_Xi_c+:xiep	100	0	0.00	0.02 +- 0.00
MCMatch_anti-Xi_c-:xiem	100	0	0.00	0.02 +- 0.00
MCMatch_Xi_c0:ximmup	100	0	0.00	0.02 +- 0.00
MCMatch_anti-Xi_c0:xipmum	100	0	0.00	0.02 +- 0.00
MCMatch_Xi_c0:ximep	100	0	0.00	0.02 +- 0.00
MCMatch_anti-Xi_c0:xipem	100	0	0.00	0.02 +- 0.00
VariablesToNtuple_Xi_c+:ximup	100	0	0.00	0.02 +- 0.00
VariablesToNtuple_Xi_c+:xiep	100	0	0.00	0.02 +- 0.00
VariablesToNtuple_anti-Xi_c-:xiem	100	0	0.00	0.02 +- 0.00
VariablesToNtuple_anti-Xi_c-:ximum	100	0	0.00	0.02 +- 0.00
VariablesToNtuple_Xi_c0:ximmup	100	0	0.00	0.02 +- 0.00
VariablesToNtuple_Xi_c0:ximep	100	0	0.00	0.02 +- 0.02
VariablesToNtuple_anti-Xi_c0:xipmum	100	0	0.00	0.02 +- 0.00
VariablesToNtuple_anti-Xi_c0:xipem	100	0	0.00	0.02 +- 0.00
Total	101	76	3.78	37.47 +- 308.37