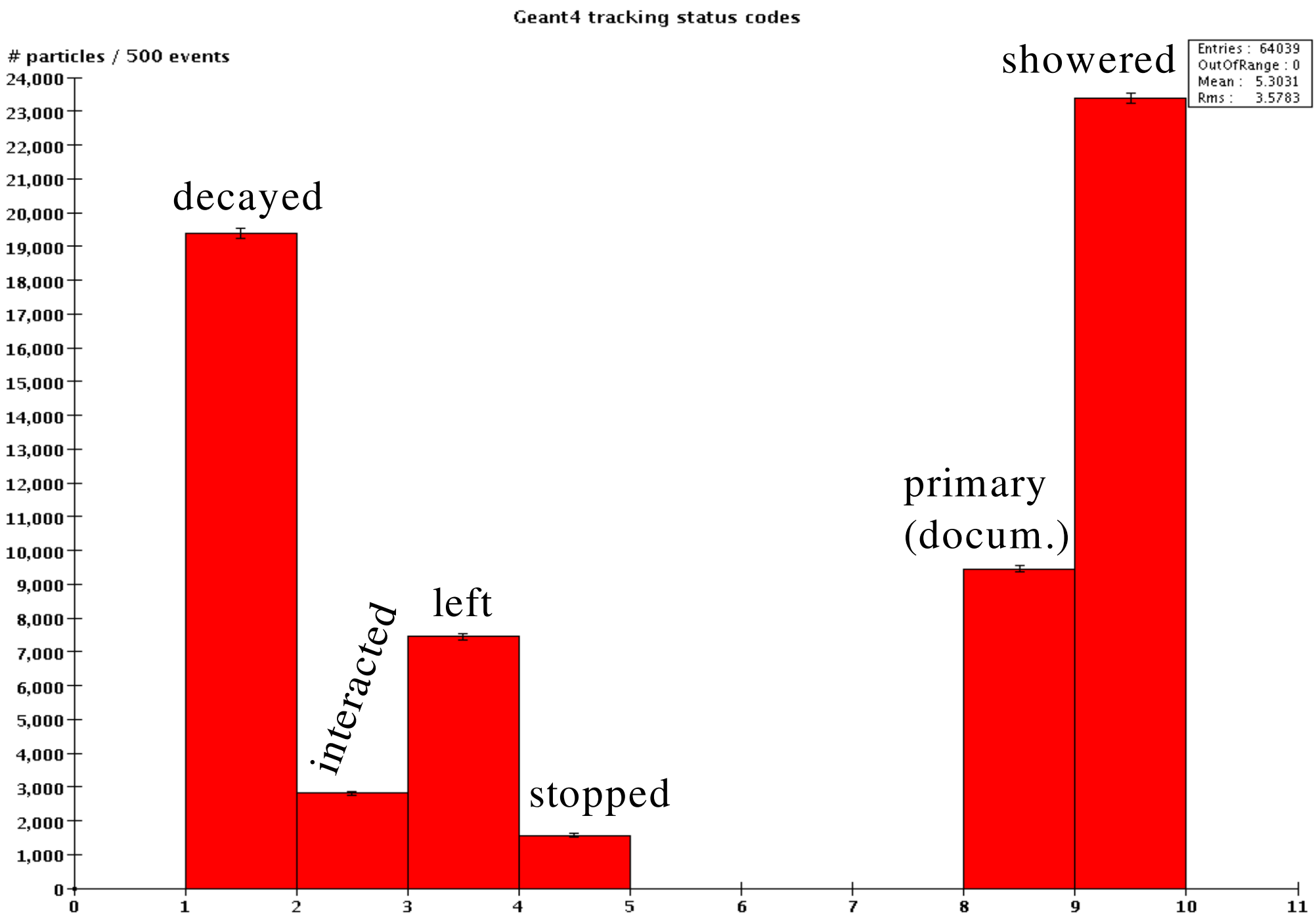
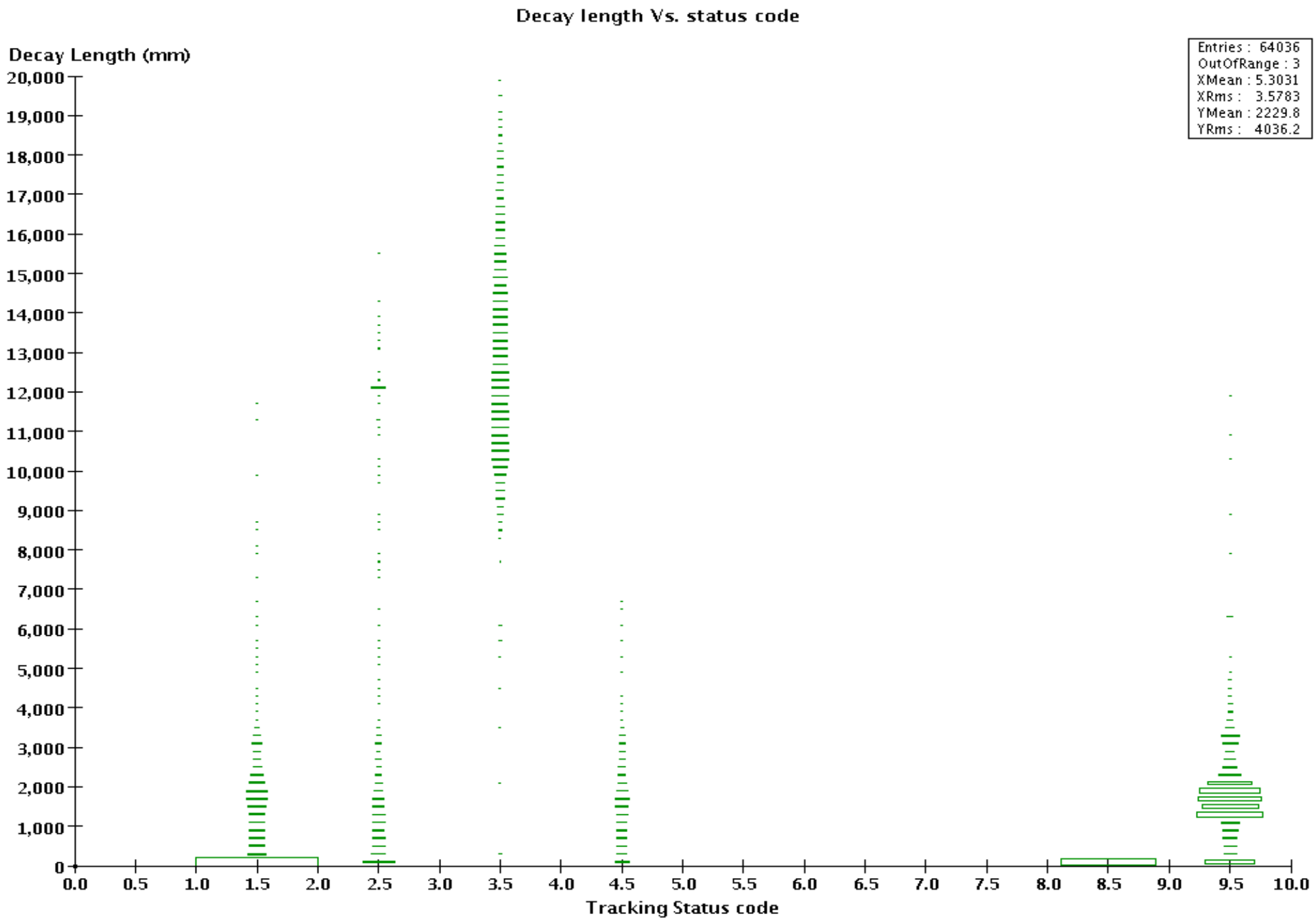
# LCDG4 Status Report

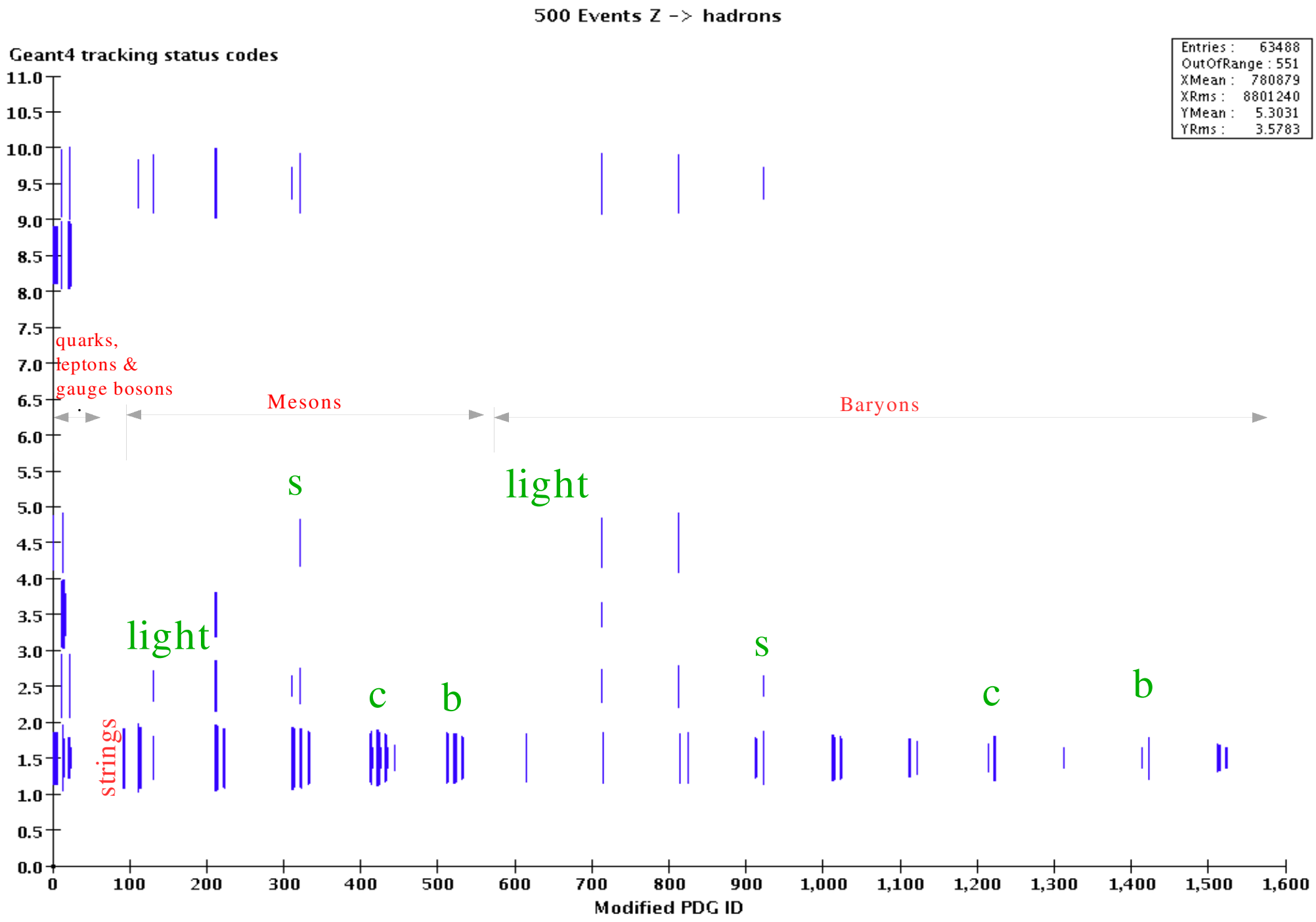
Guilherme Lima
DHCal Meetings
March 10, 2004

# Since last report

- Several fixes in latest LCDG4 version
  - Calorimeter entrance points: position and momentum
  - Splitting of G4Tracks into two or more McParts at interaction vertices
  - If a preassigned decay is superseded, reset the parent's generator status to FINAL STATE
  - Tracker hits from calorimeter backscatterings point to NULL instead of shower originator
- Still not working:
  - LCIO output


Geant4 tracking status codes
# particles / 500 events
Entries : 64039
OutOfRange : 0
Mean : 5.3031
Rms : 3.5783
decayed
interacted
left
stopped
primary
(docum.)
showered
24,000
23,000
22,000
21,000
20,000
19,000
18,000
17,000
16,000
15,000
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
0
1
2
3
4
5
6
7
8
9
10
11


Decay length Vs. status code
Decay Length (mm)
Entries : 64036
OutOfRange : 3
XMean : 5.3031
XRms : 3.5783
YMean : 2229.8
YRms : 4036.2
20,000
19,000
18,000
17,000
16,000
15,000
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
10.0
Tracking Status code


500 Events Z -> hadrons
Geant4 tracking status codes
Entries : 63488
OutOfRange : 551
XMean : 780879
XRms : 8801240
YMean : 5.3031
YRms : 3.5783
quarks,
leptons &
gauge bosons
Mesons
Baryons
strings
light
s
c
b
light
s
c
b
Modified PDG ID

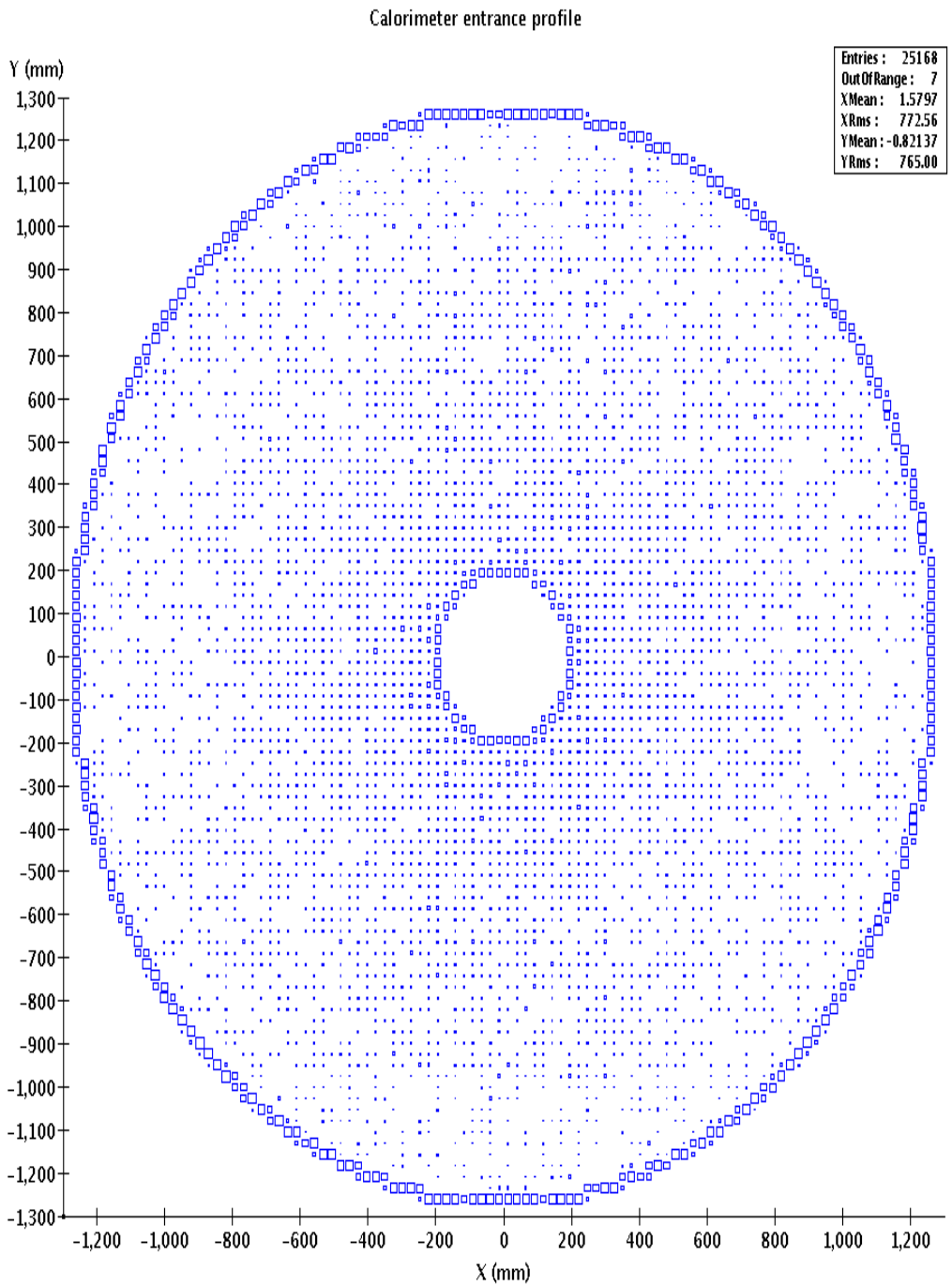
# G4Track splitting in output

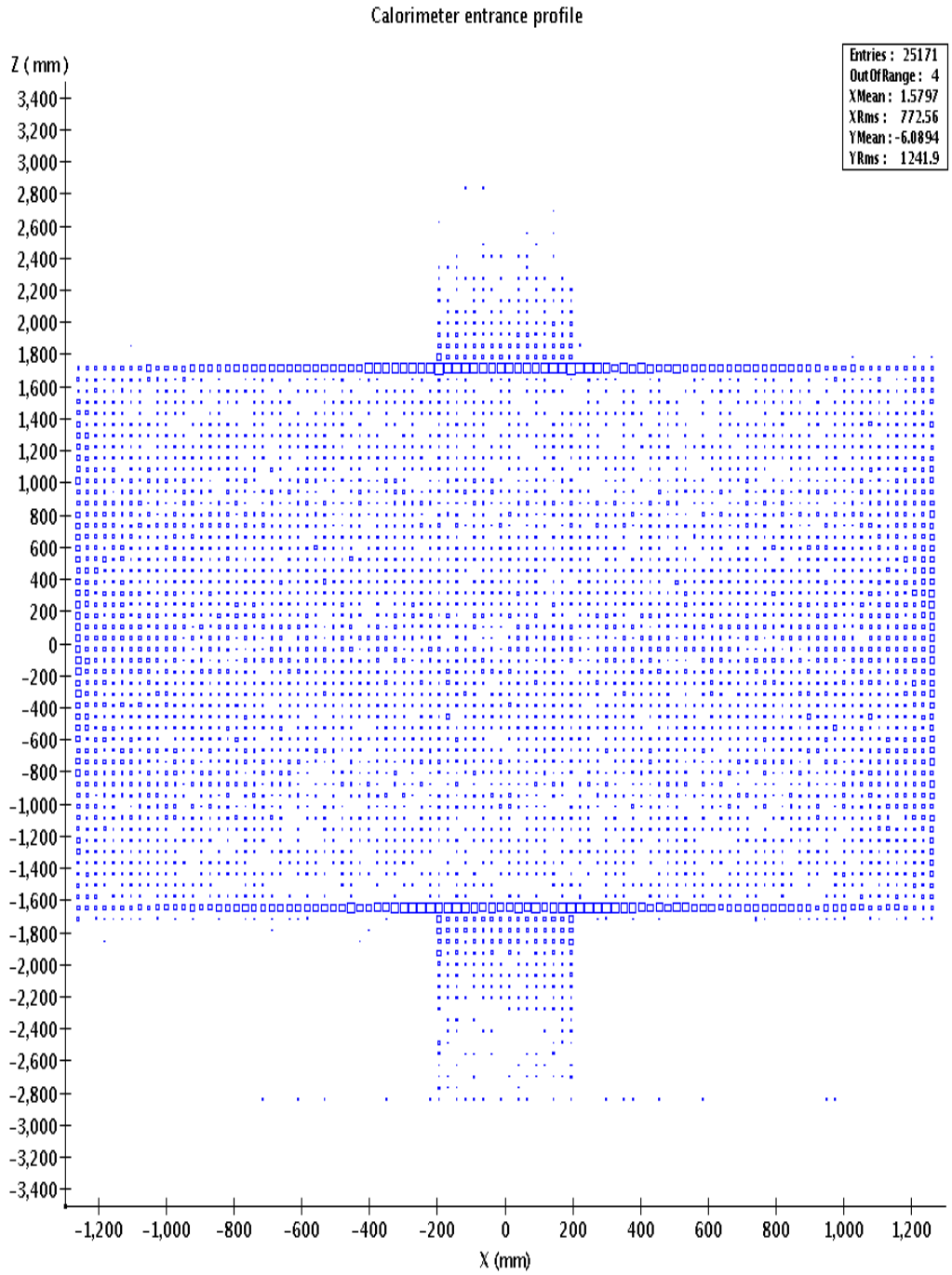
Welcome | MC Tree | View 1

Run 10 Event 0

- HepEvt (mass=0.0 id=99999999 charge=0)(E=0 status=3)(gismoStatus=8)
  - e- (mass=5.11E-4 id=11 charge=-1)(E=45.500 status=3)(gismoStatus=8)
    - e- (mass=5.11E-4 id=11 charge=-1)(E=45.500 status=3)(gismoStatus=8)
      - e- (mass=5.11E-4 id=11 charge=-1)(E=45.500 status=3)(gismoStatus=8)
        - Zo (mass=91.187 id=23 charge=0)(E=90.939 status=3)(gismoStatus=8)
          - c (mass=1.4 id=4 charge=0.667)(E=45.477 status=3)(gismoStatus=8)
            - c (mass=1.4 id=4 charge=0.667)(E=43.924 status=2)(gismoStatus=1)
              - unknown (id=92)(E=90.939 status=2)(gismoStatus=1)
                - D*0 (mass=2.0071 id=423 charge=0)(E=31.152 status=2)(gismoStatus=1)
                - pi0 (mass=0.13497389999999998 id=111 charge=0)(E=4.0177 status=2)(gismoStatus=1)
                - rho+ (mass=0.7683 id=213 charge=1)(E=1.8167 status=2)(gismoStatus=1)
                - pi0 (mass=0.13497389999999998 id=111 charge=0)(E=0.39386 status=2)(gismoStatus=1)
                - rho- (mass=0.7683 id=-213 charge=-1)(E=3.5983 status=2)(gismoStatus=1)
                - eta (mass=0.5474500000000001 id=221 charge=0)(E=0.93681 status=2)(gismoStatus=1)
                - K(892)*+ (mass=0.8915900000000001 id=323 charge=0)(E=1.6848 status=2)(gismoStatus=1)
                - phi (mass=1.019412 id=333 charge=0)(E=1.2191 status=2)(gismoStatus=1)
                  - K- (mass=0.49364600000000003 id=-321 charge=-1)(E=0.64408 status=1)(gismoStatus=9)
                  - K+ (mass=0.49364600000000003 id=321 charge=1)(E=0.57504 status=1)(gismoStatus=1)
                    - pi+ (mass=0.1395675 id=211 charge=1)(E=0.18440 status=4)(gismoStatus=1)
                    - pi0 (mass=0.13497389999999998 id=111 charge=0)(E=0.16835 status=4)(gismoStatus=1)
                    - pi0 (mass=0.13497389999999998 id=111 charge=0)(E=0.22175 status=4)(gismoStatus=1)
                - K*-(892) (mass=0.8915900000000001 id=-323 charge=-0)(E=1.3484 status=2)(gismoStatus=1)
                - rho0 (mass=0.7683 id=113 charge=0)(E=0.91559 status=2)(gismoStatus=1)
                - K+ (mass=0.49364600000000003 id=321 charge=1)(E=2.2225 status=1)(gismoStatus=1)
                - K*-(892) (mass=0.8915900000000001 id=-323 charge=-0)(E=14.734 status=2)(gismoStatus=1)
                - D*0-bar (mass=2.0071 id=-423 charge=-0)(E=26.898 status=2)(gismoStatus=1)
                  - D0-bar (mass=1.8645 id=-421 charge=-0)(E=25.040 status=2)(gismoStatus=1)
                    - K+ (mass=0.49364600000000003 id=321 charge=1)(E=4.0586 status=1)(gismoStatus=1)
                      - mu+ (mass=0.105658 id=-13 charge=1)(E=0.23565 status=4)(gismoStatus=1)
                        - e+ (mass=5.11E-4 id=-11 charge=1)(E=0.030347 status=4)(gismoStatus=9)
                        - nu_e (mass=0.0 id=12 charge=0)(E=0.037843 status=4)(gismoStatus=3)
                        - nu_mu_bar (mass=0.0 id=-14 charge=-0)(E=0.035979 status=4)(gismoStatus=3)
                      - nu_mu (mass=0.0 id=14 charge=0)(E=0.23553 status=4)(gismoStatus=3)
                    - a1- (mass=1.23 id=-20213 charge=-0)(E=20.982 status=2)(gismoStatus=1)
                      - rho0 (mass=0.7683 id=113 charge=0)(E=17.098 status=2)(gismoStatus=1)
                        - pi+ (mass=0.1395675 id=211 charge=1)(E=2.6499 status=1)(gismoStatus=9)
                        - pi- (mass=0.1395675 id=-211 charge=-1)(E=14.448 status=1)(gismoStatus=2)
                          - pi- (mass=0.1395675 id=-211 charge=-1)(E=14.444 status=4)(gismoStatus=9)
                          - e- (mass=5.11E-4 id=11 charge=-1)(E=3.2899E-3 status=4)(gismoStatus=2)
                      - pi- (mass=0.1395675 id=-211 charge=-1)(E=3.8838 status=1)(gismoStatus=9)
                  - gamma (mass=0.0 id=22 charge=0)(E=1.8573 status=1)(gismoStatus=9)
          - c_bar (mass=1.4 id=-4 charge=-0.667)(E=45.461 status=3)(gismoStatus=8)
            - gluon (mass=0.0 id=21 charge=0)(E=3.3701 status=2)(gismoStatus=8)

# Calorimeter entrance points



# Summary

- LCDG4 SIO output is quite compliant with GISMO
- Concerns on EM energy deposition
- LCDG4 to do next
  - Proj + Non-projective versions merged
  - Checks for memory leaks and optimization
  - Visualization improvement
  - LCIO output