

finding qqh_bb among all CEPC samples (cut chain)

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Motivation :

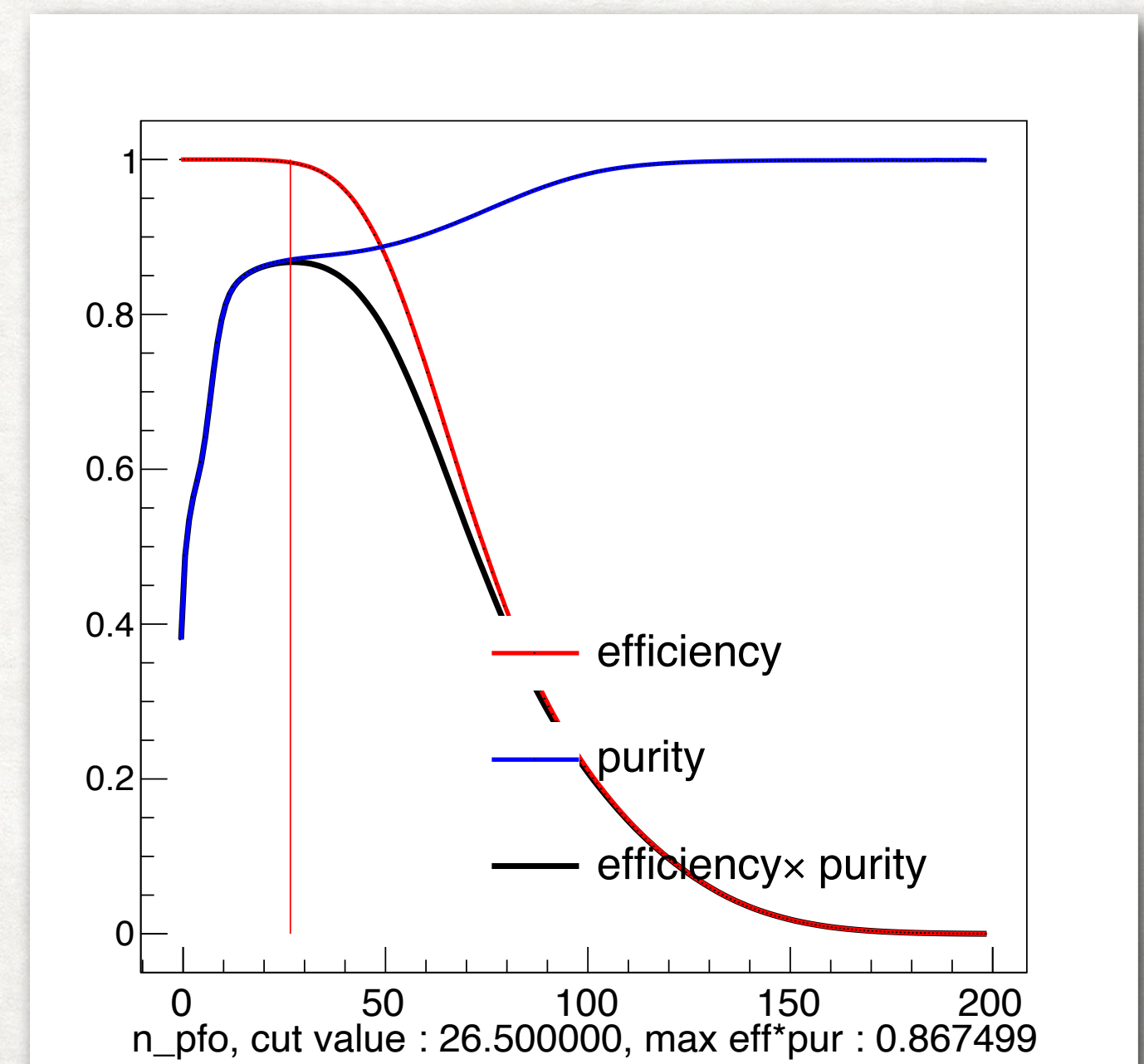
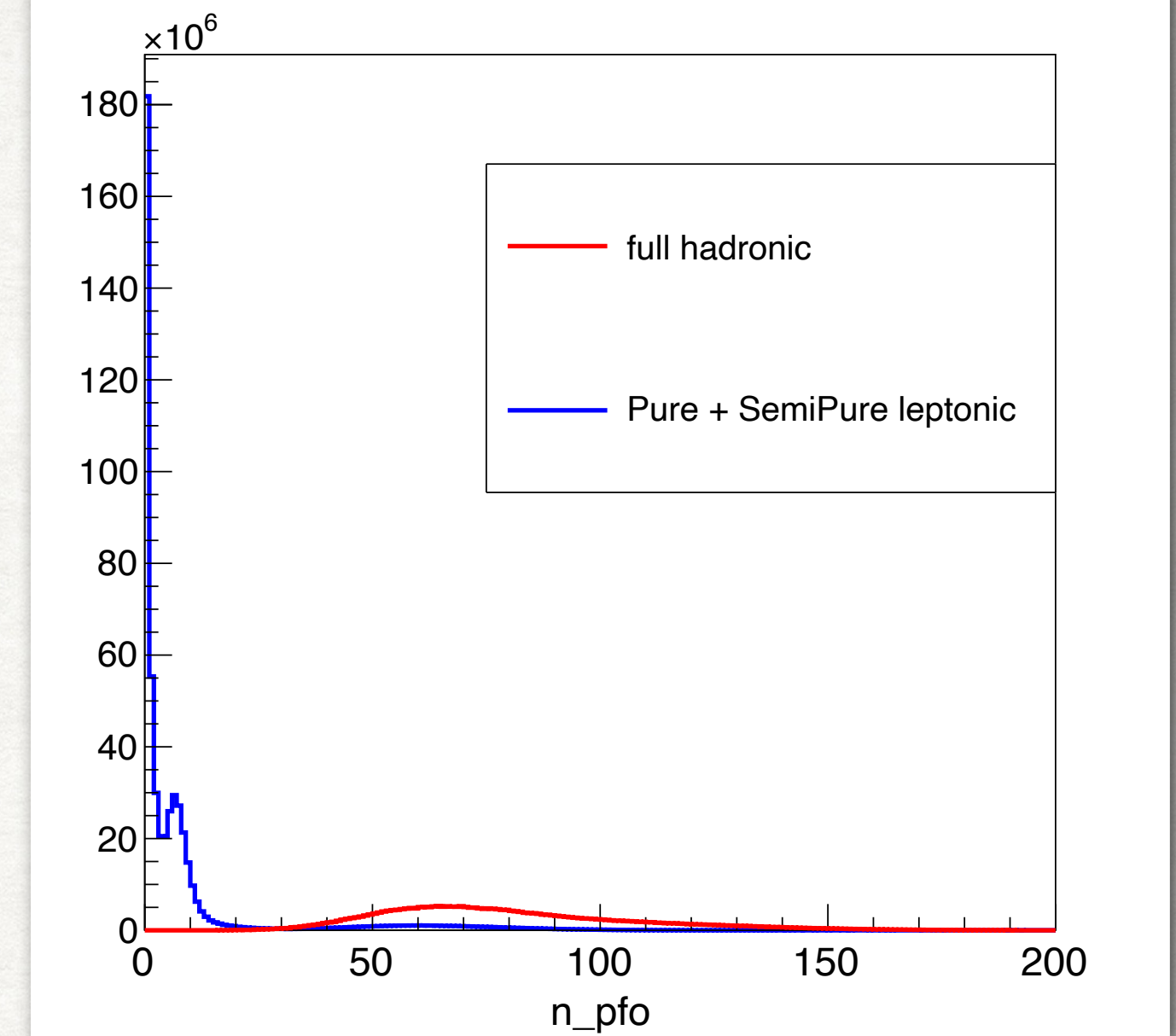
| | cross-section | expected events | ratio |
|--------|---------------|-----------------|-------|
| qqh_bb | 78.9 fb | 398445 | 57.7% |
| qqh_cc | 3.98 fb | 20099 | 2.91% |
| qqh_gg | 11.72 fb | 59186 | 8.57% |

steps :

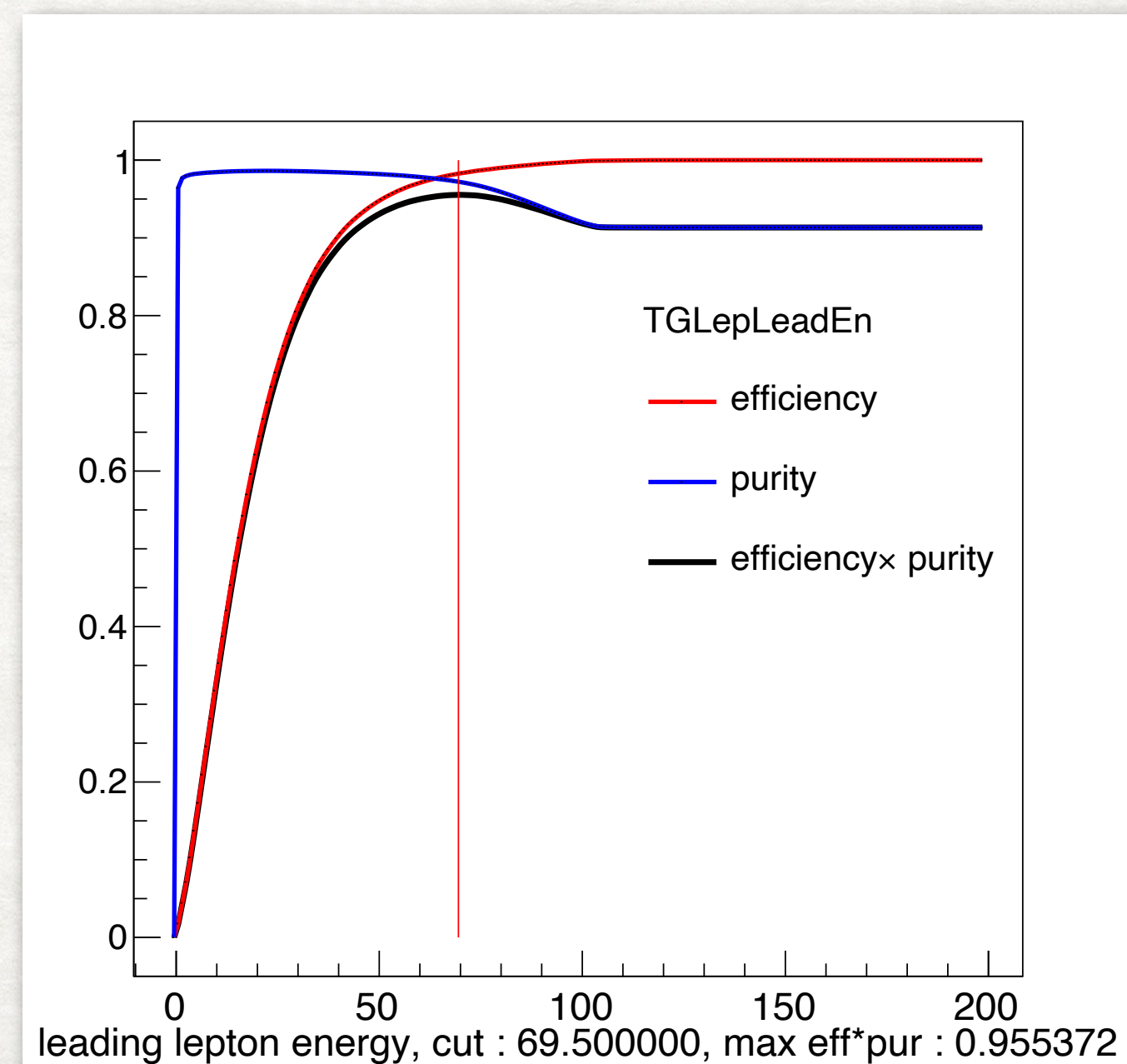
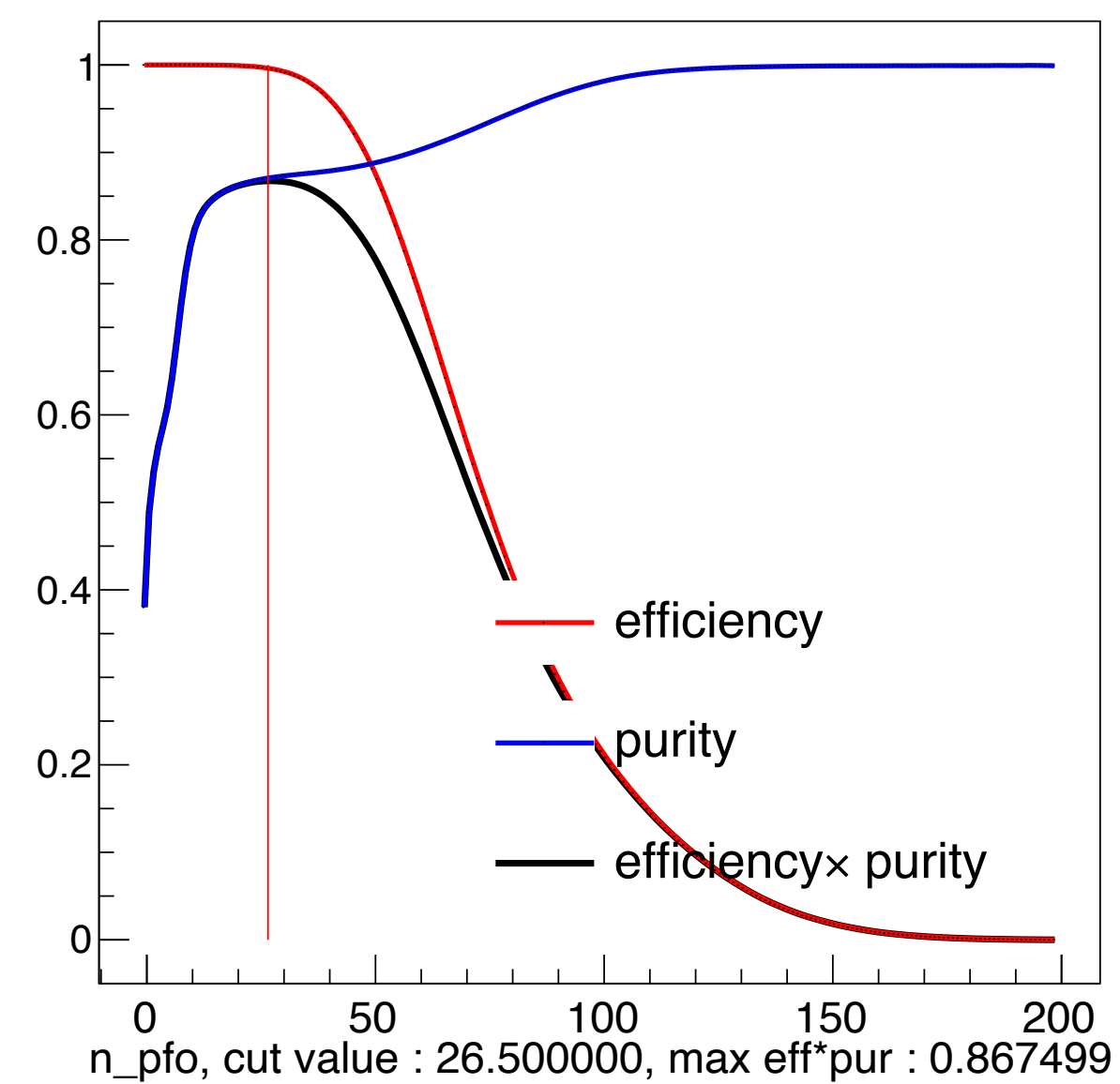
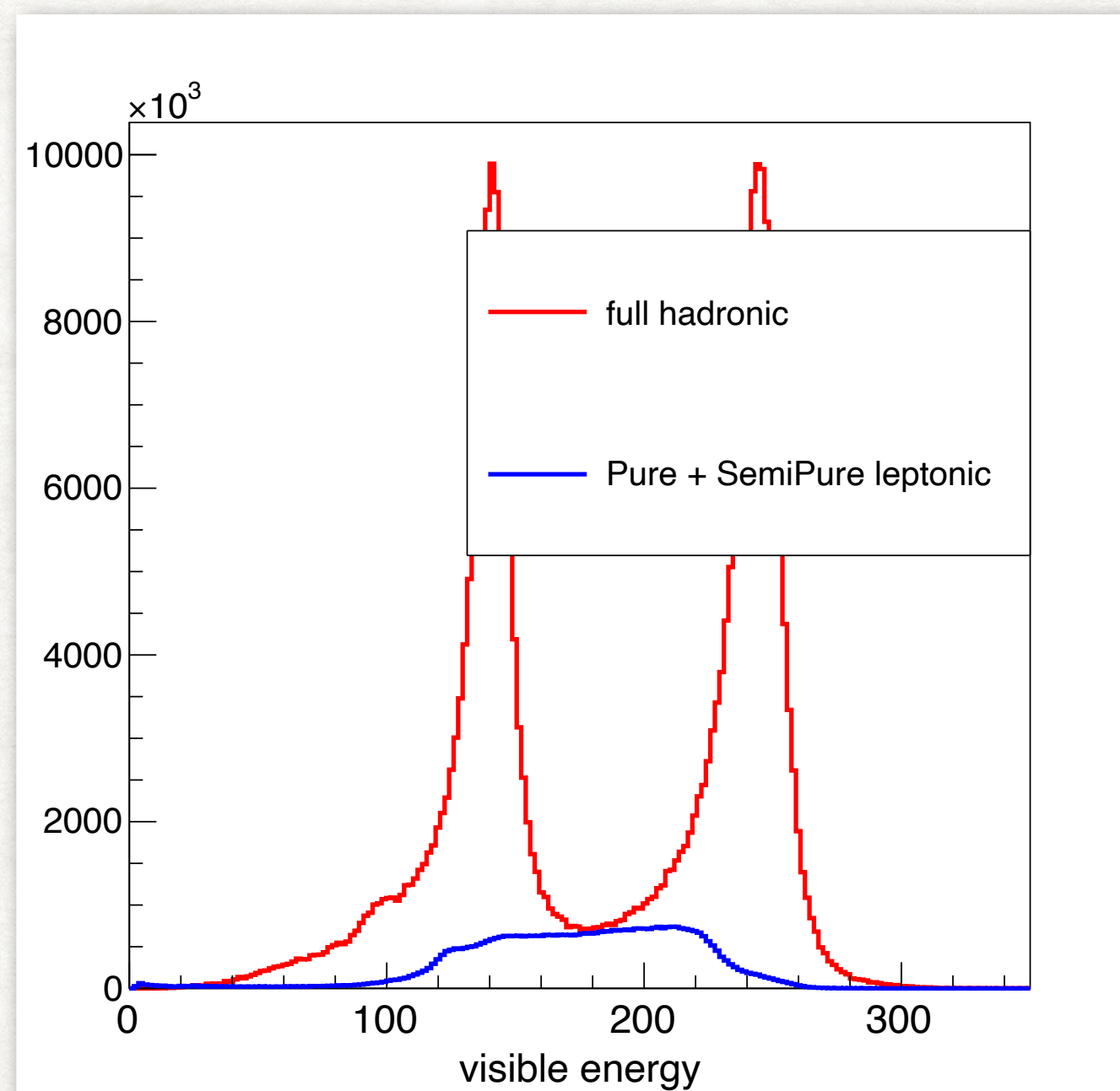
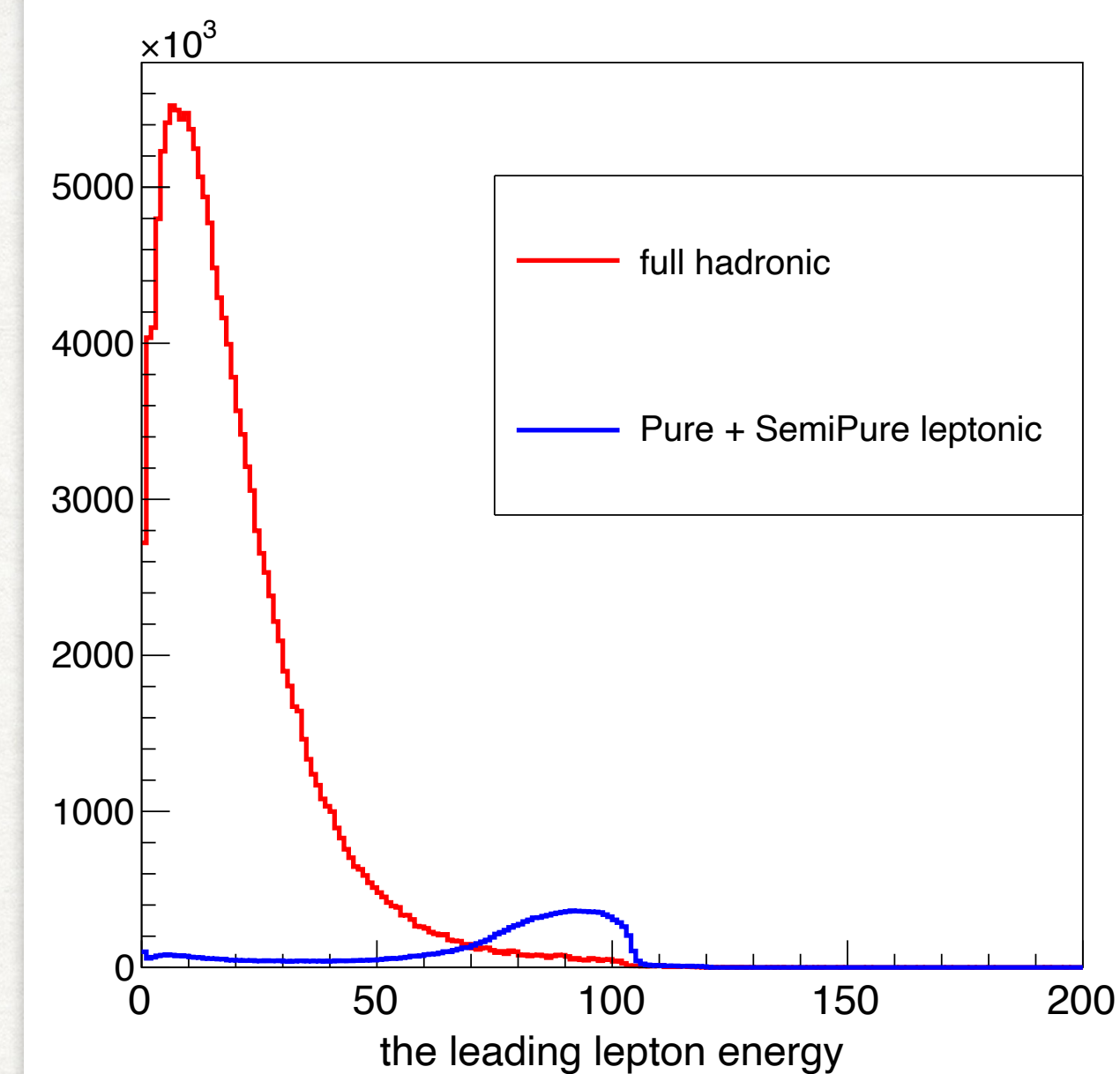
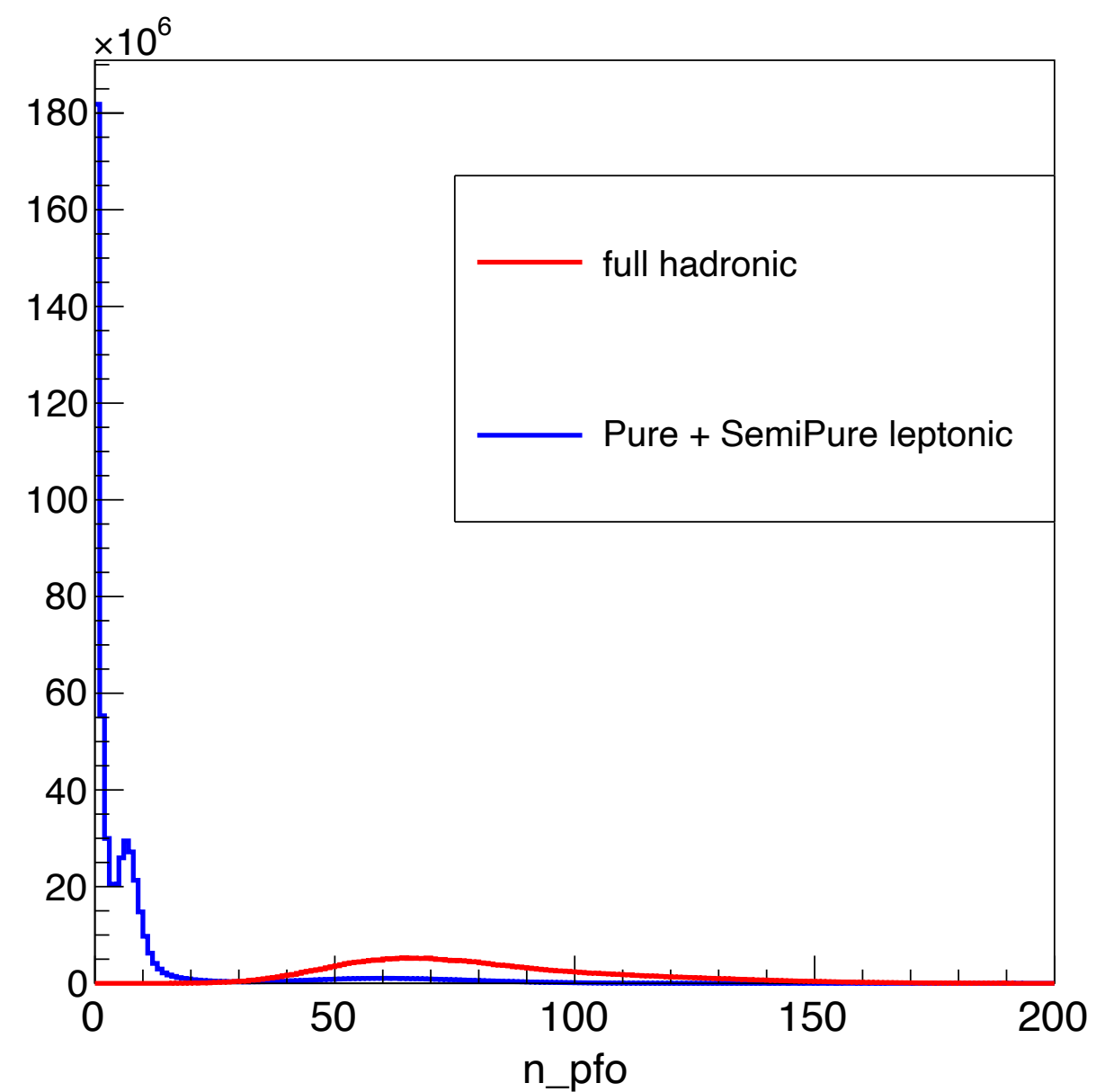
1, finding full hadronic samples

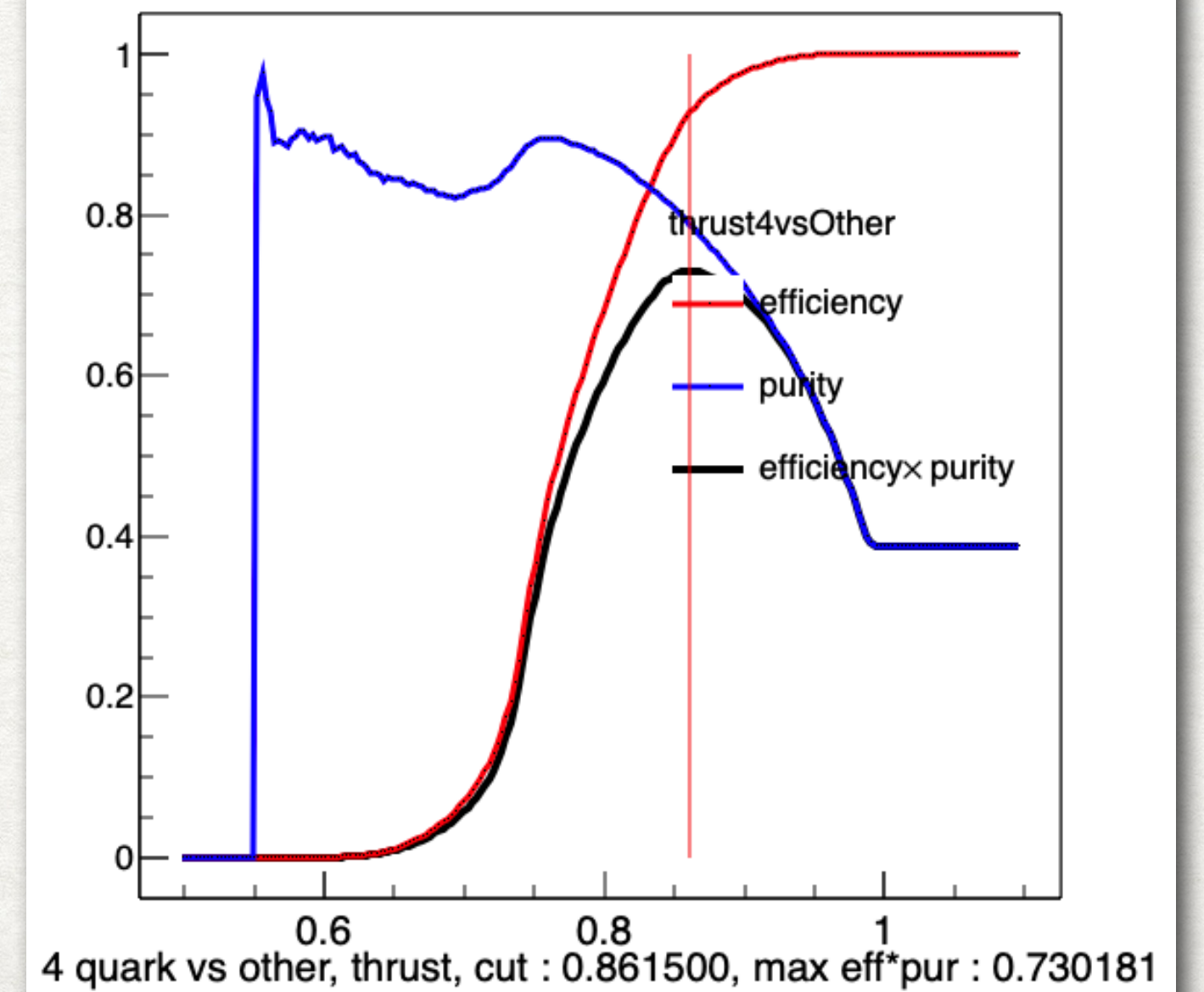
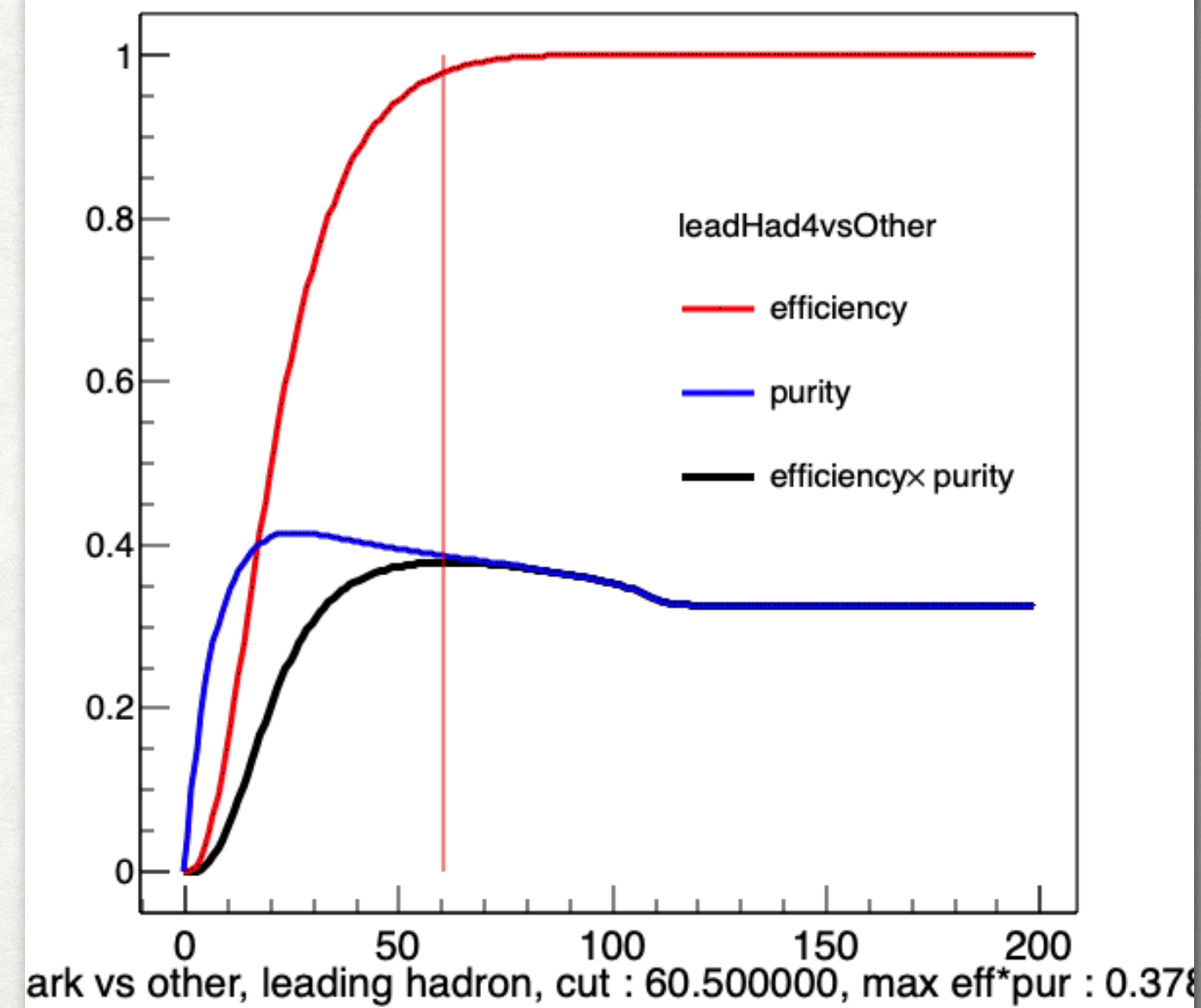
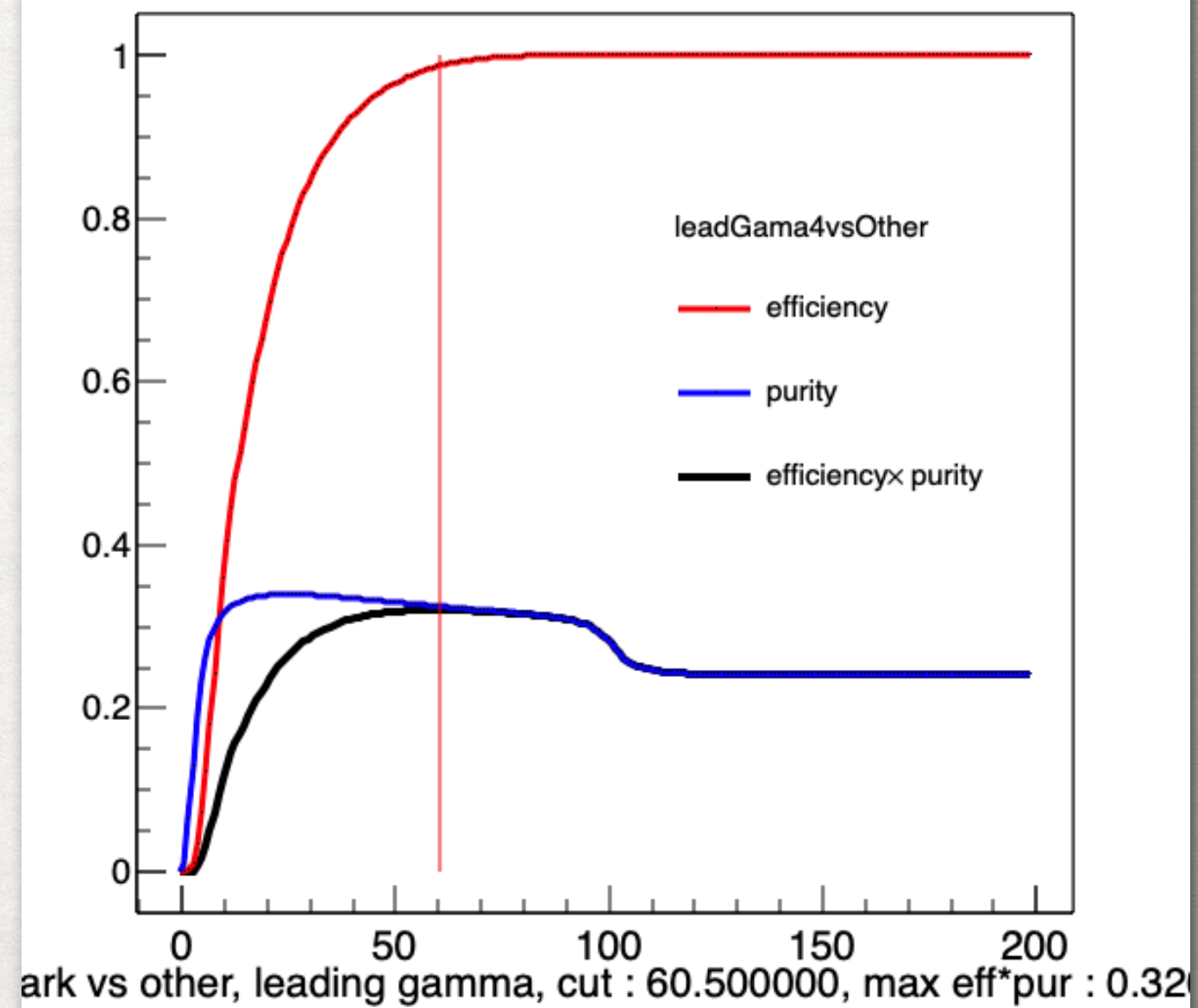
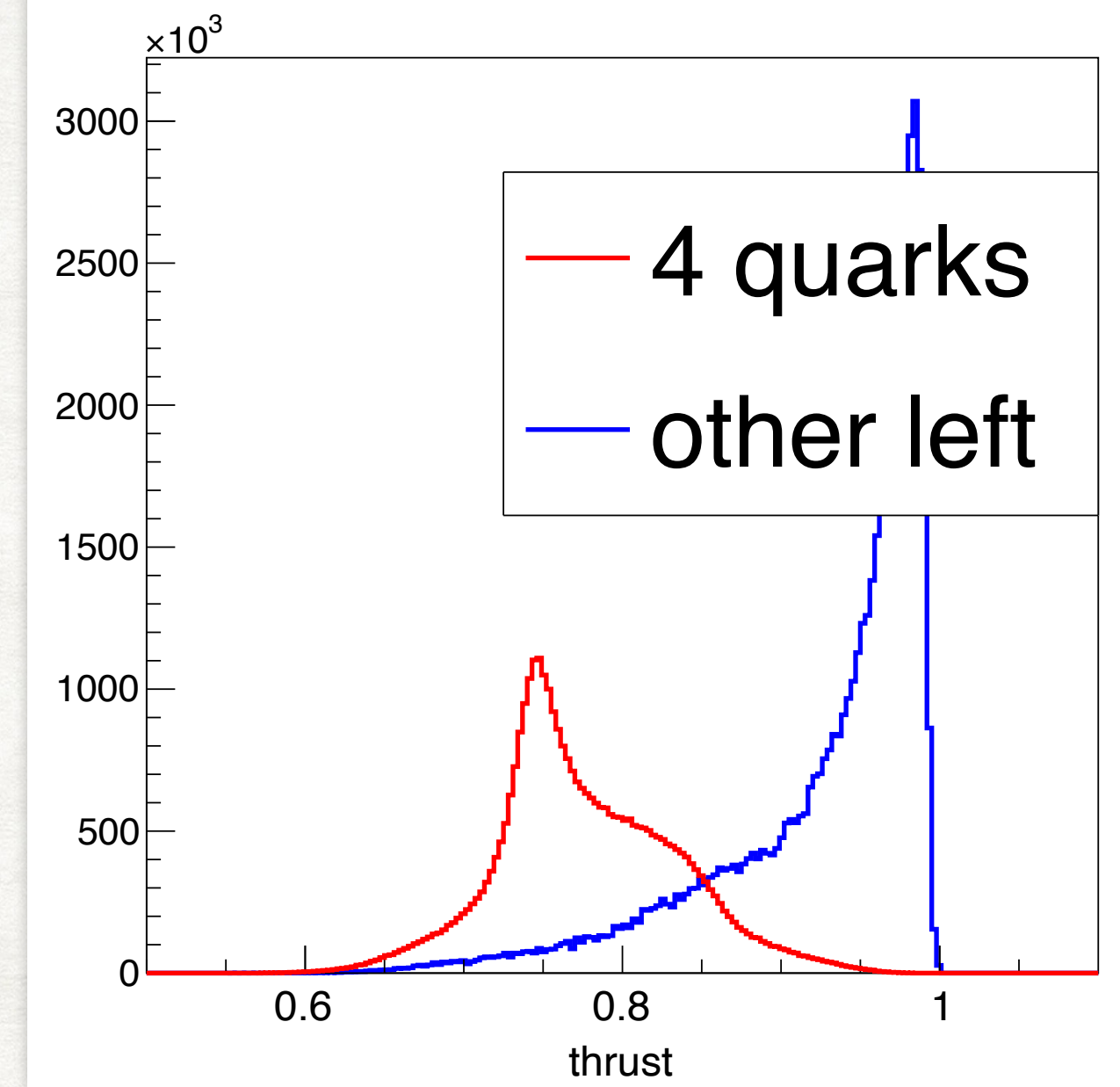
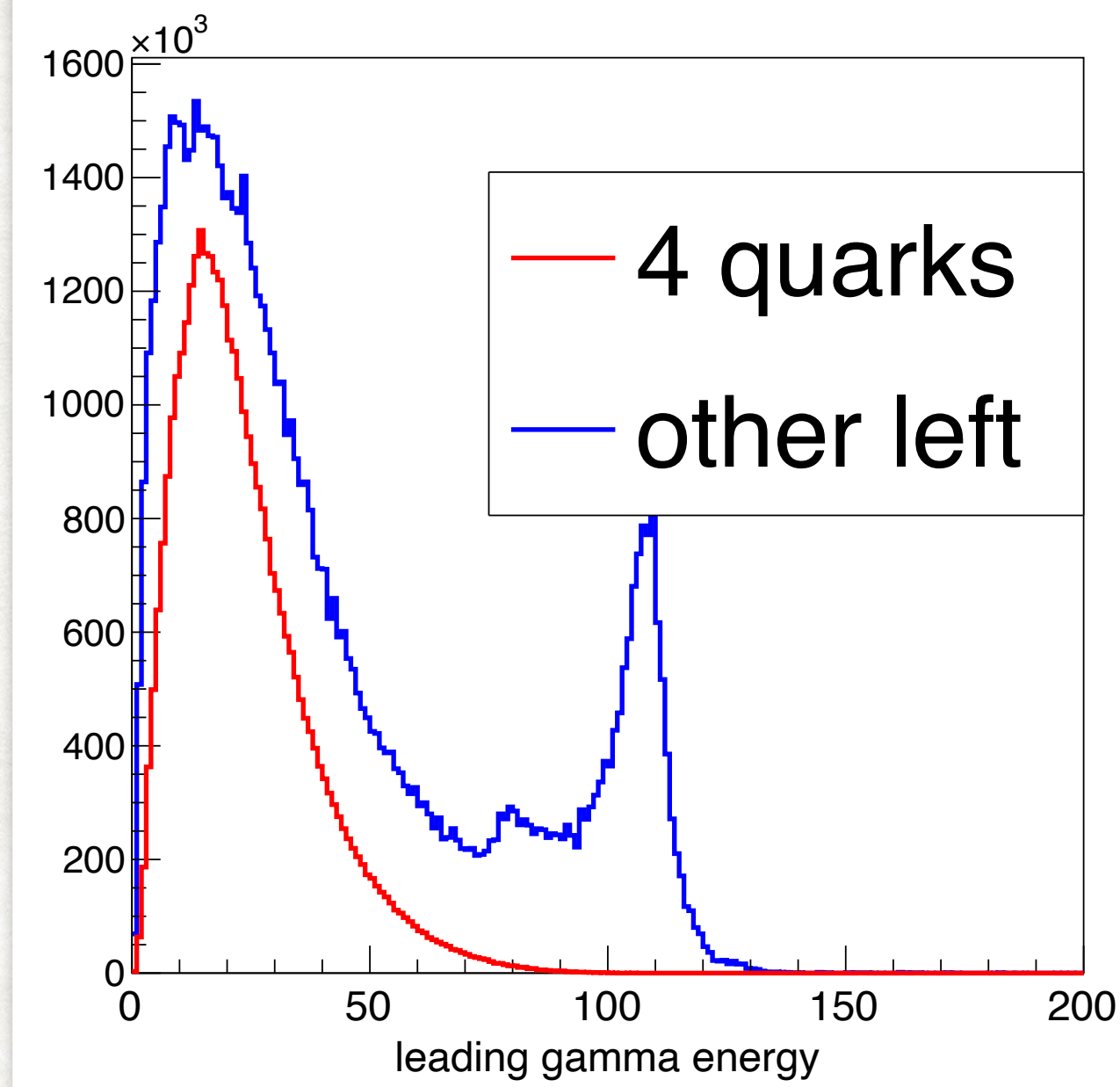
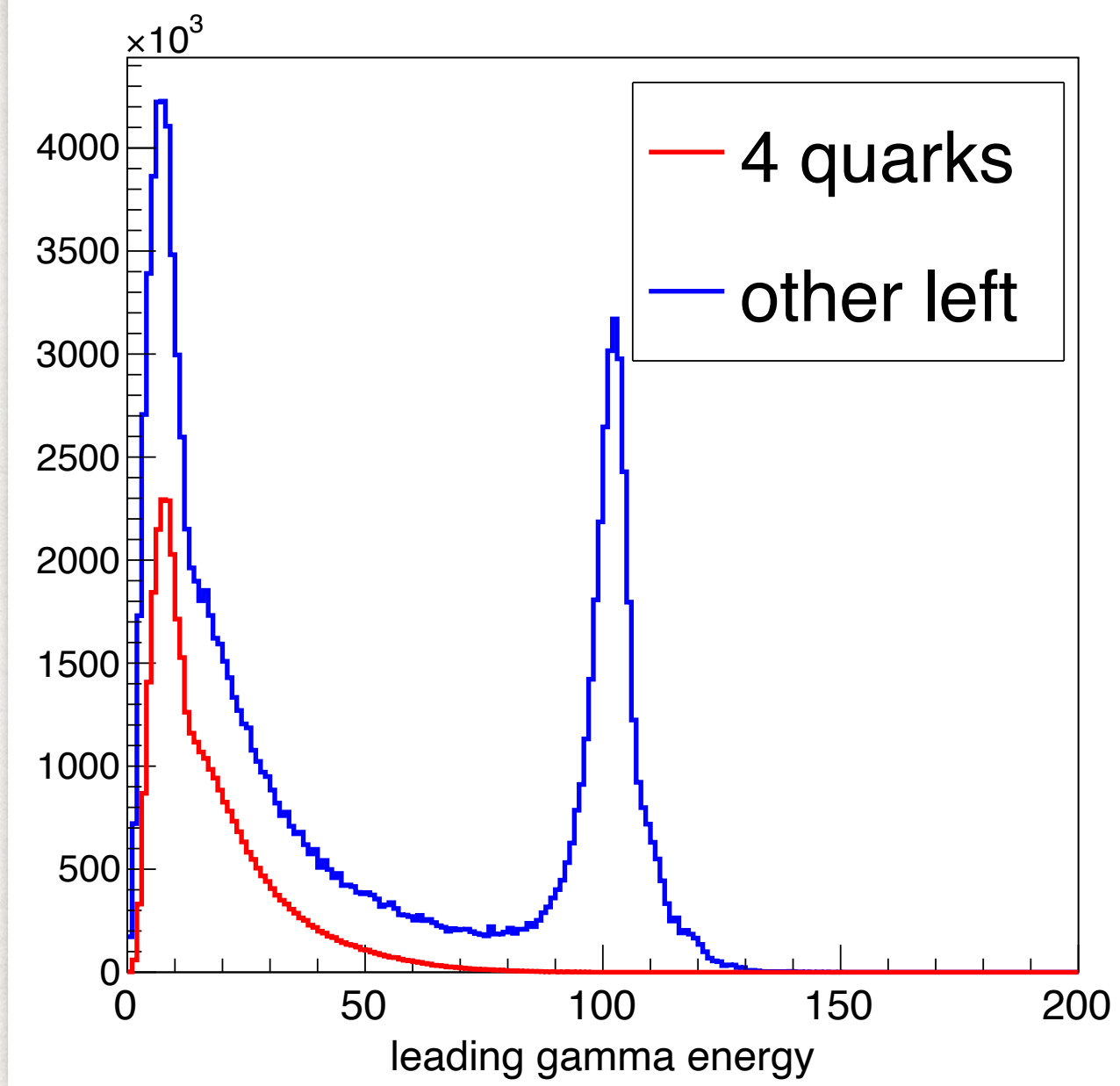
2, finding 4 quarks

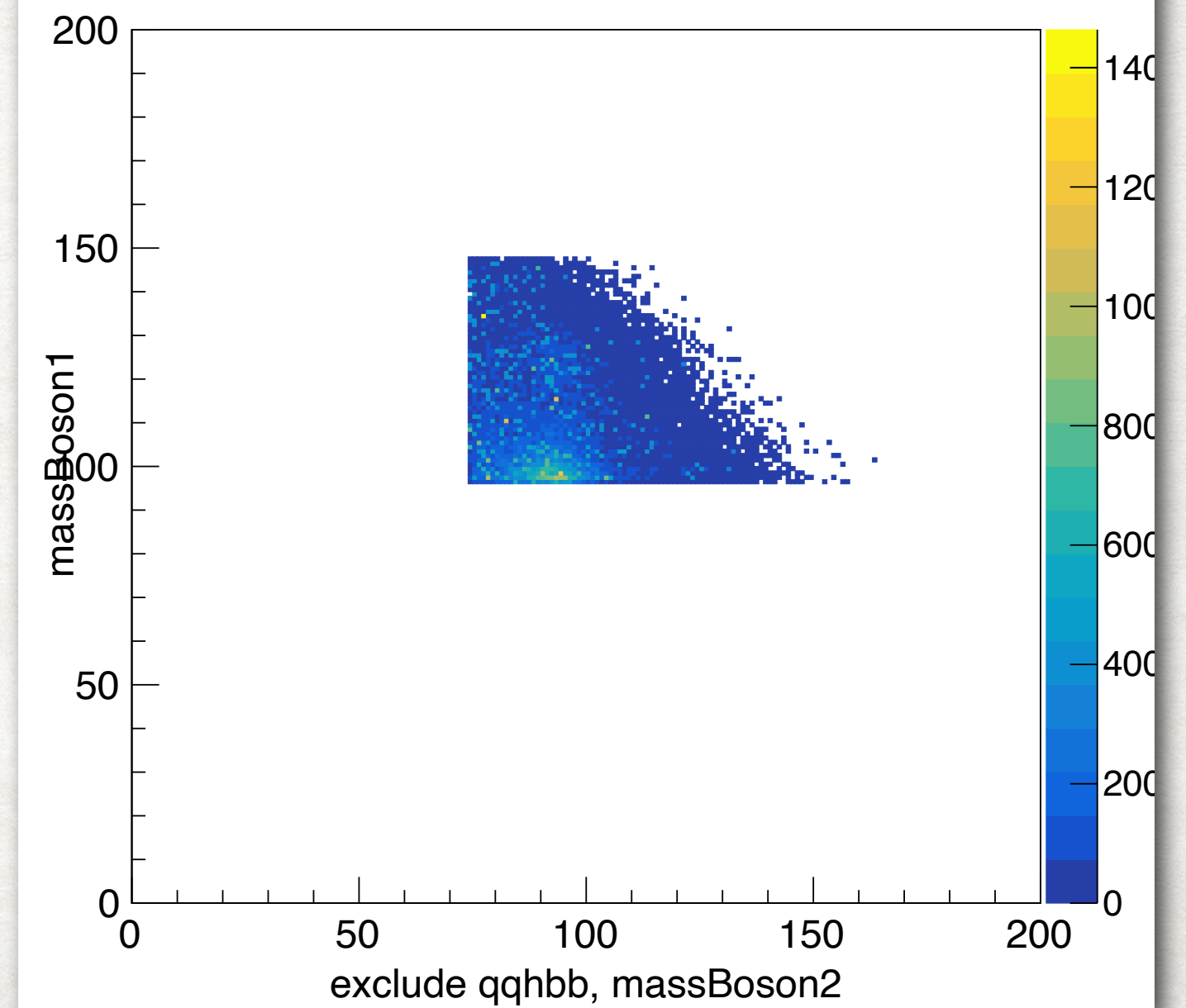
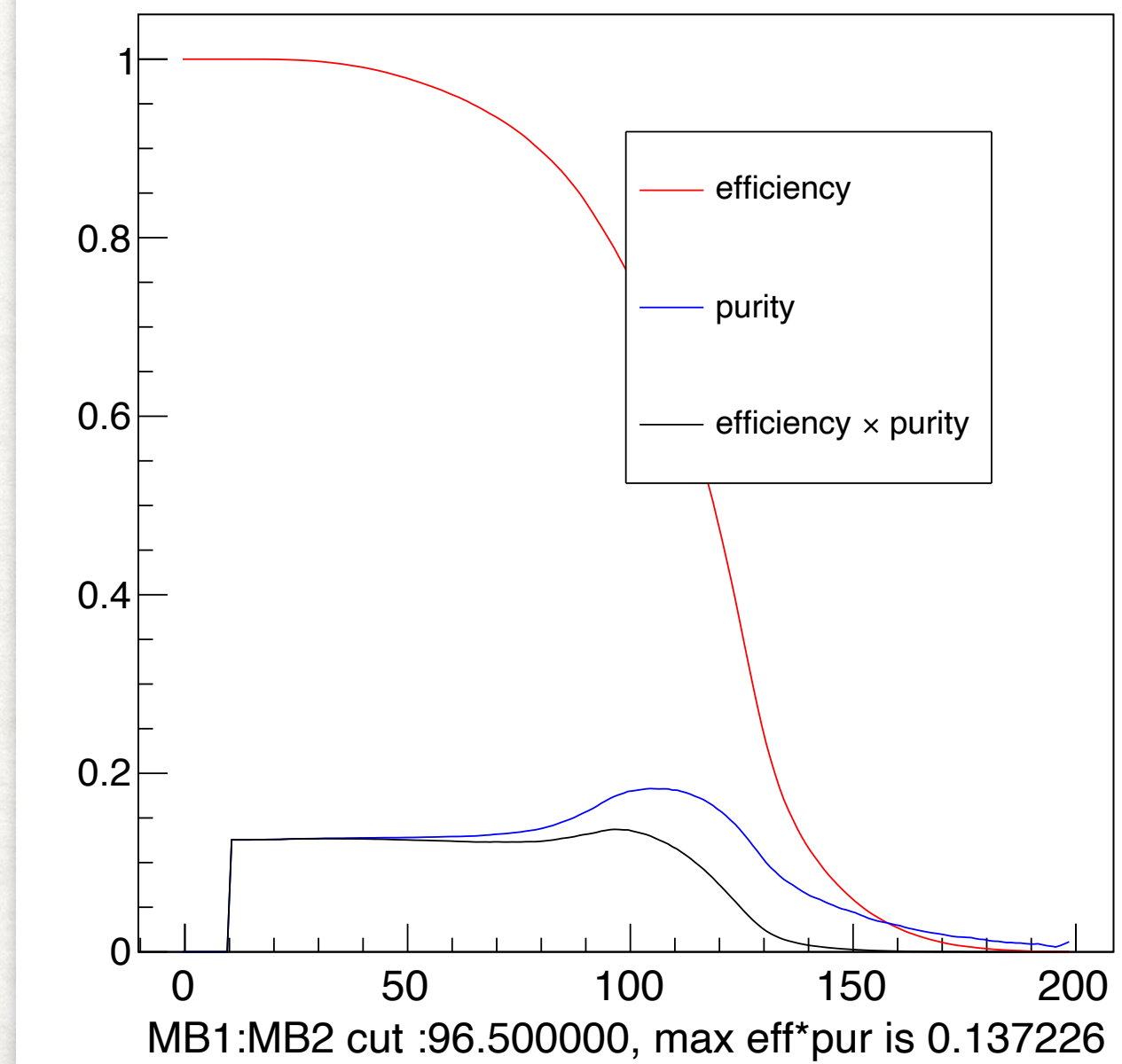
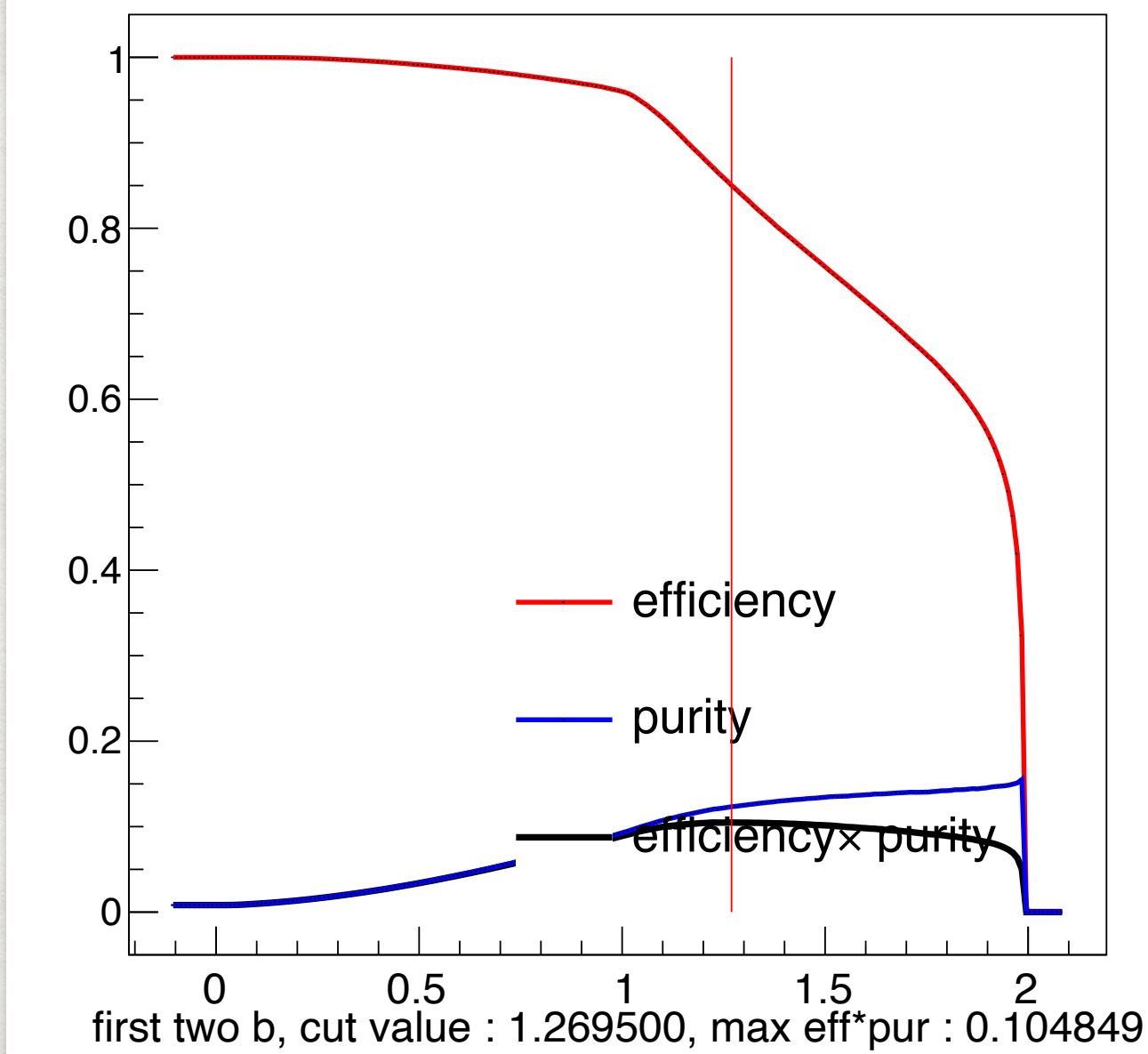
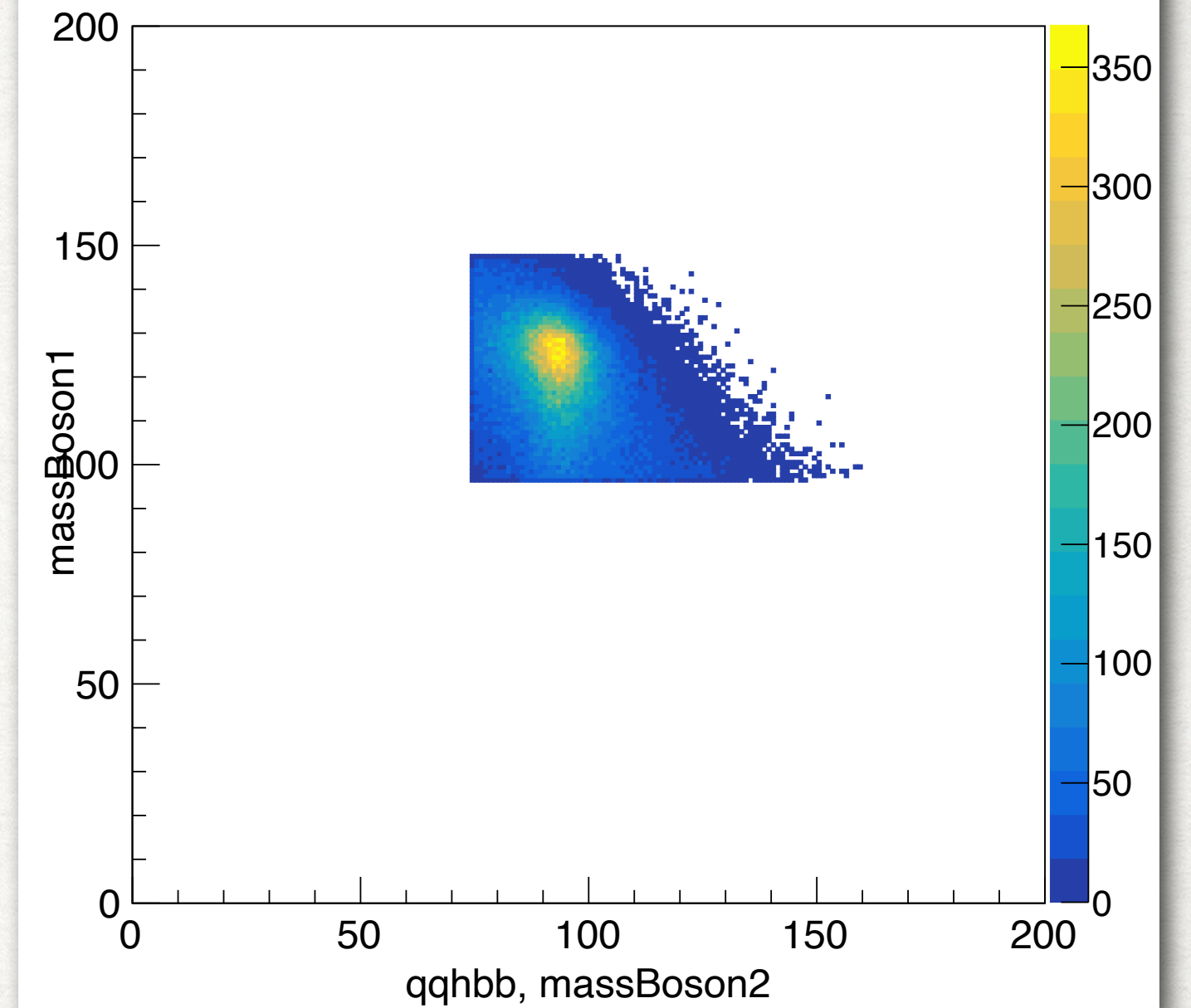
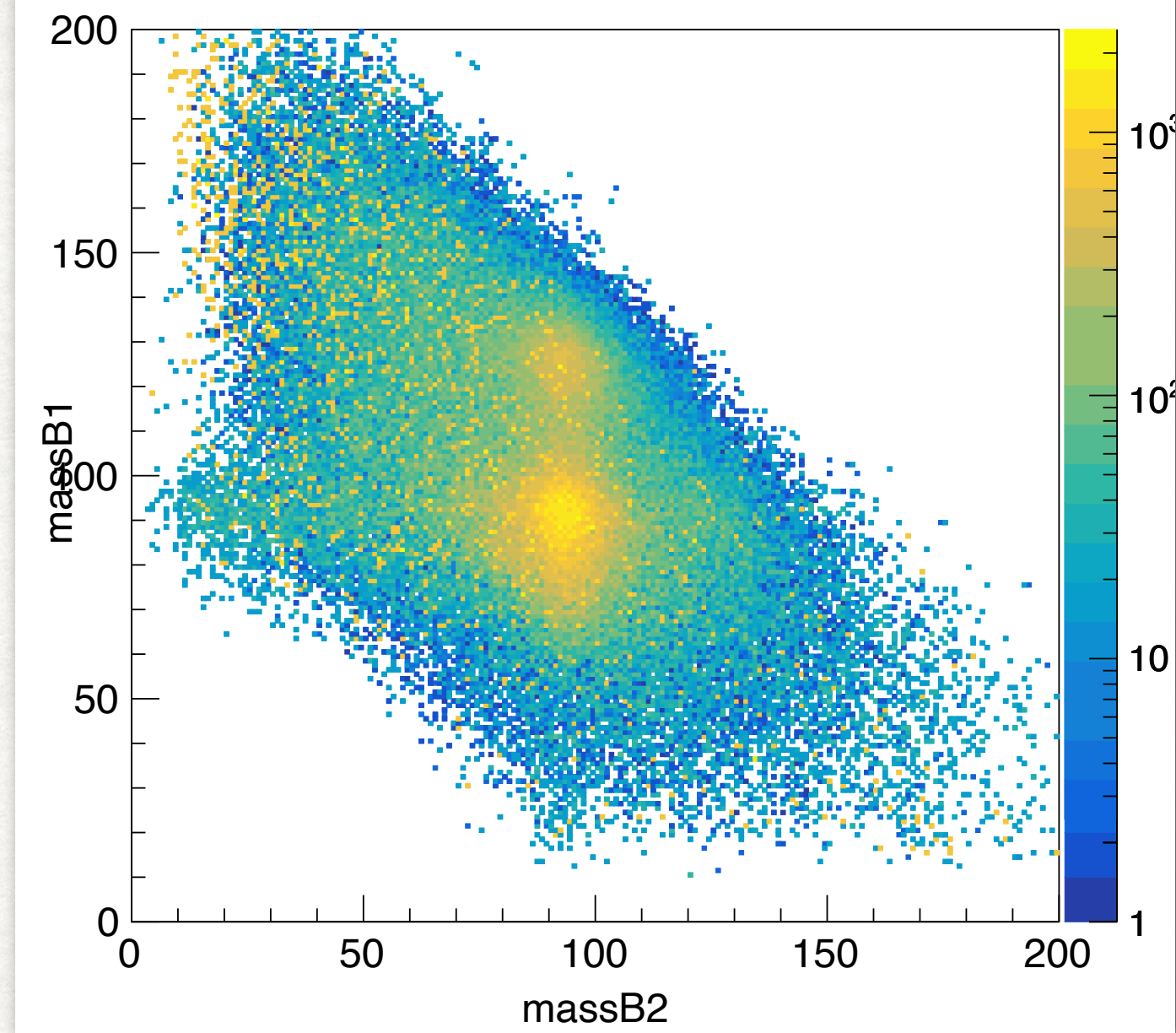
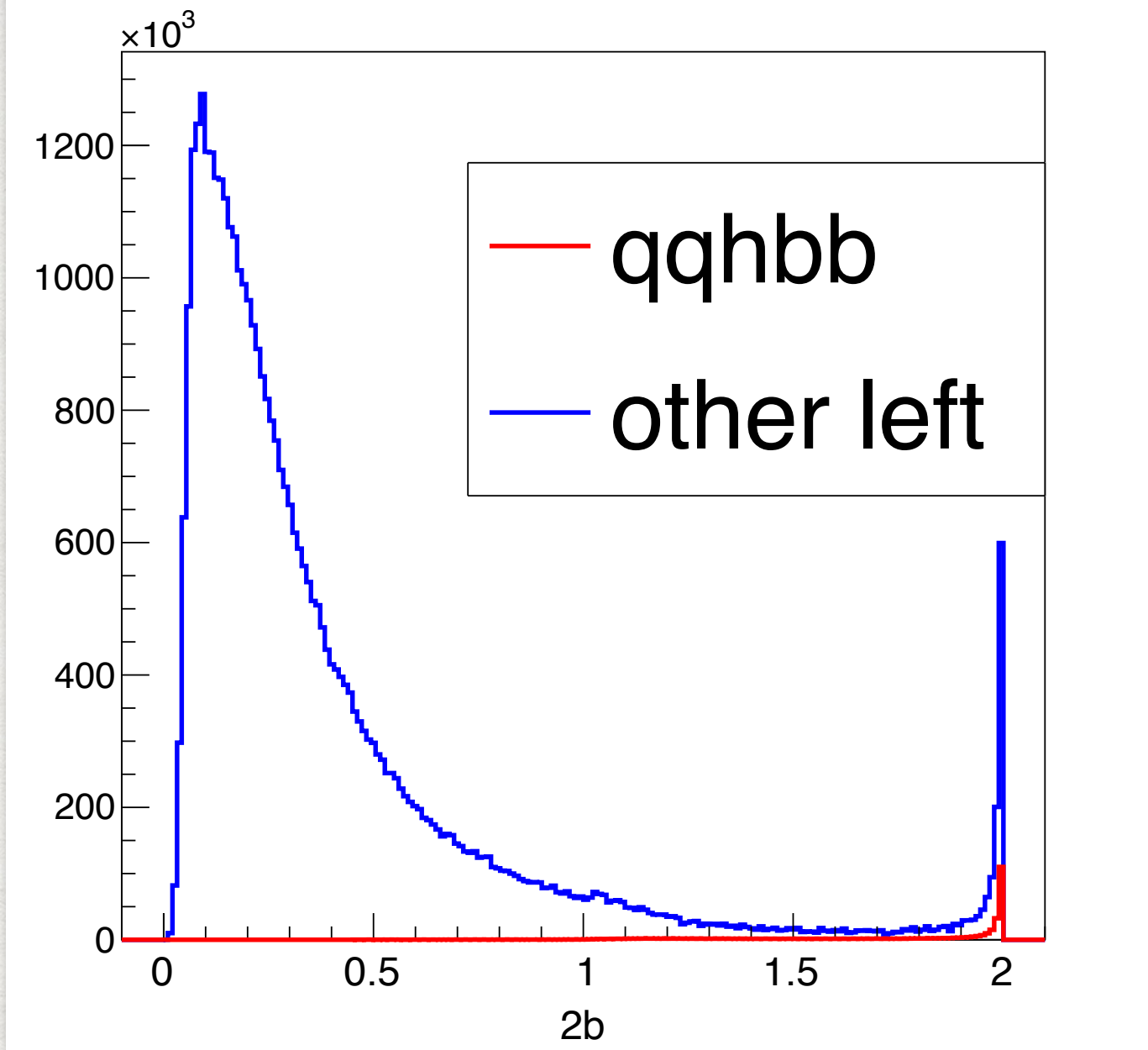
3, finding qqh_bb

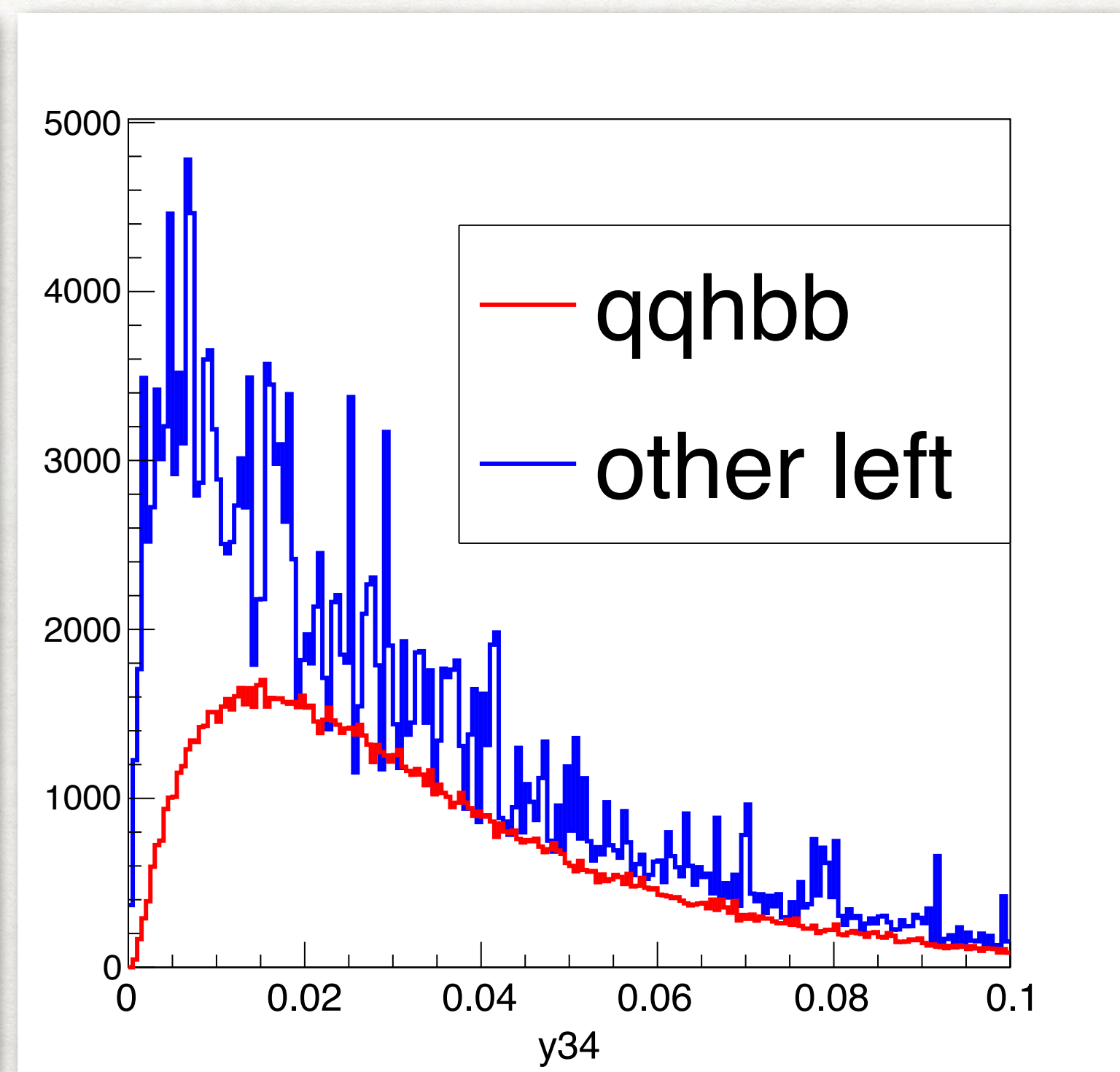
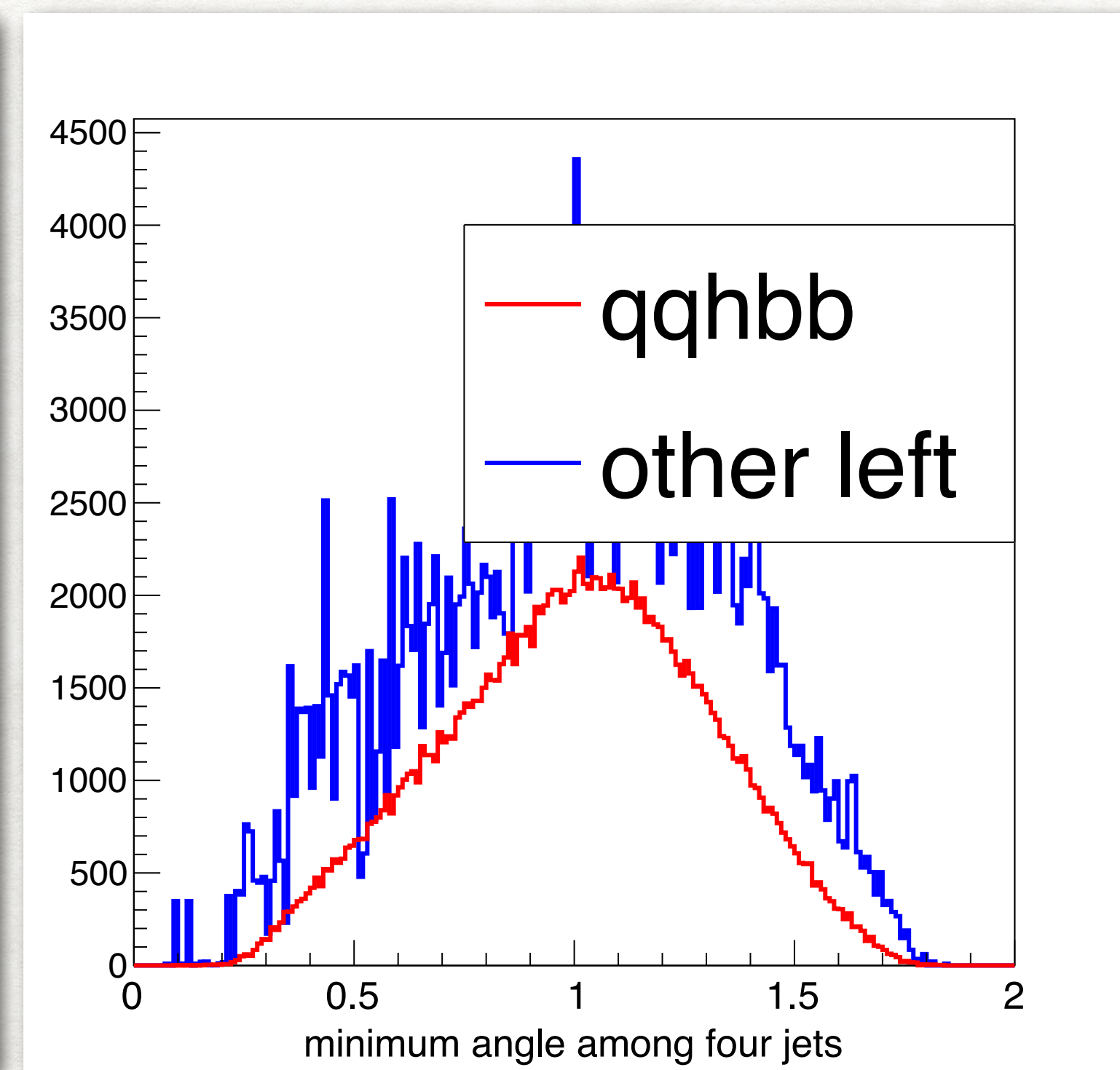
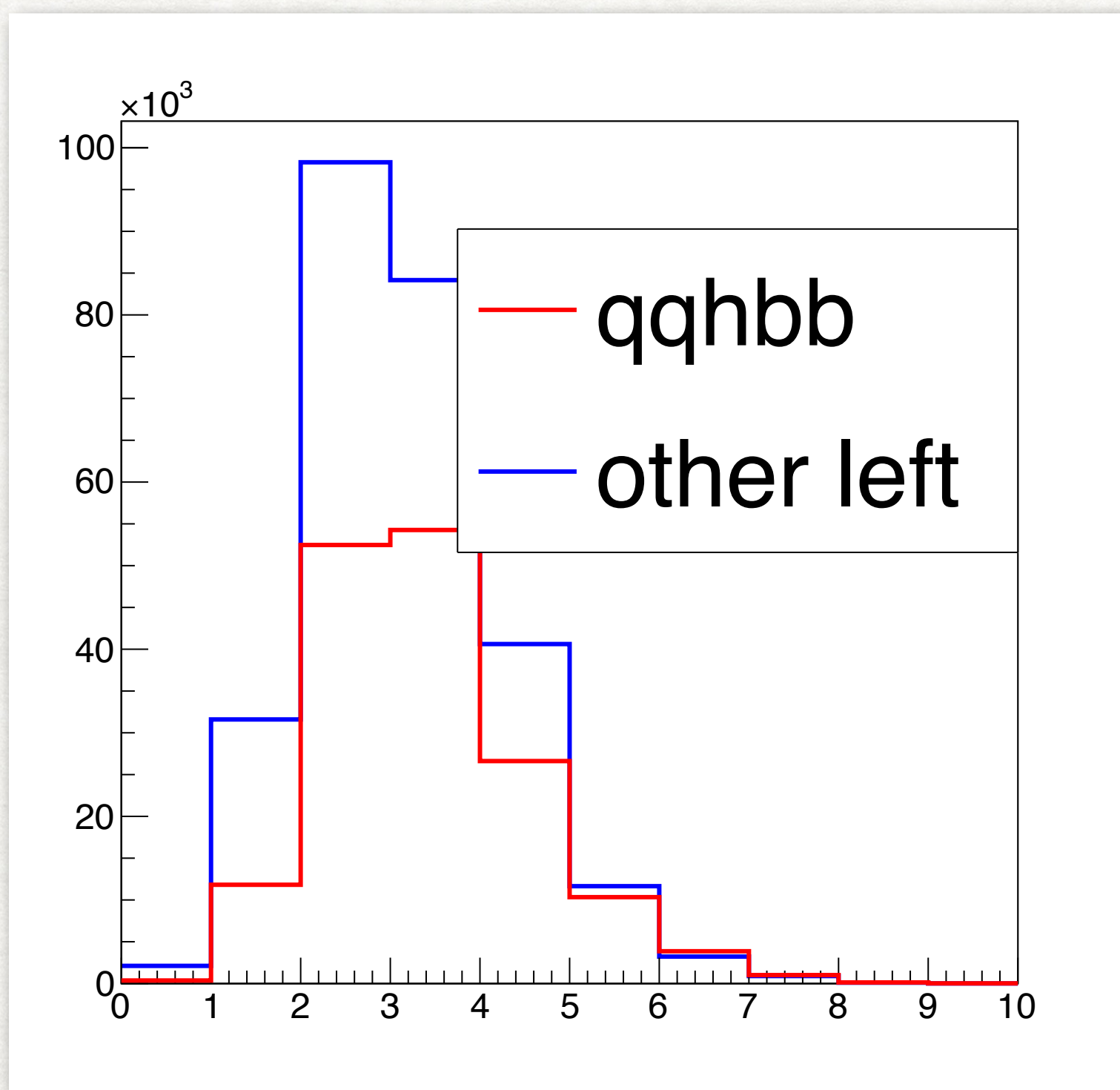


1, finding full hadronic samples



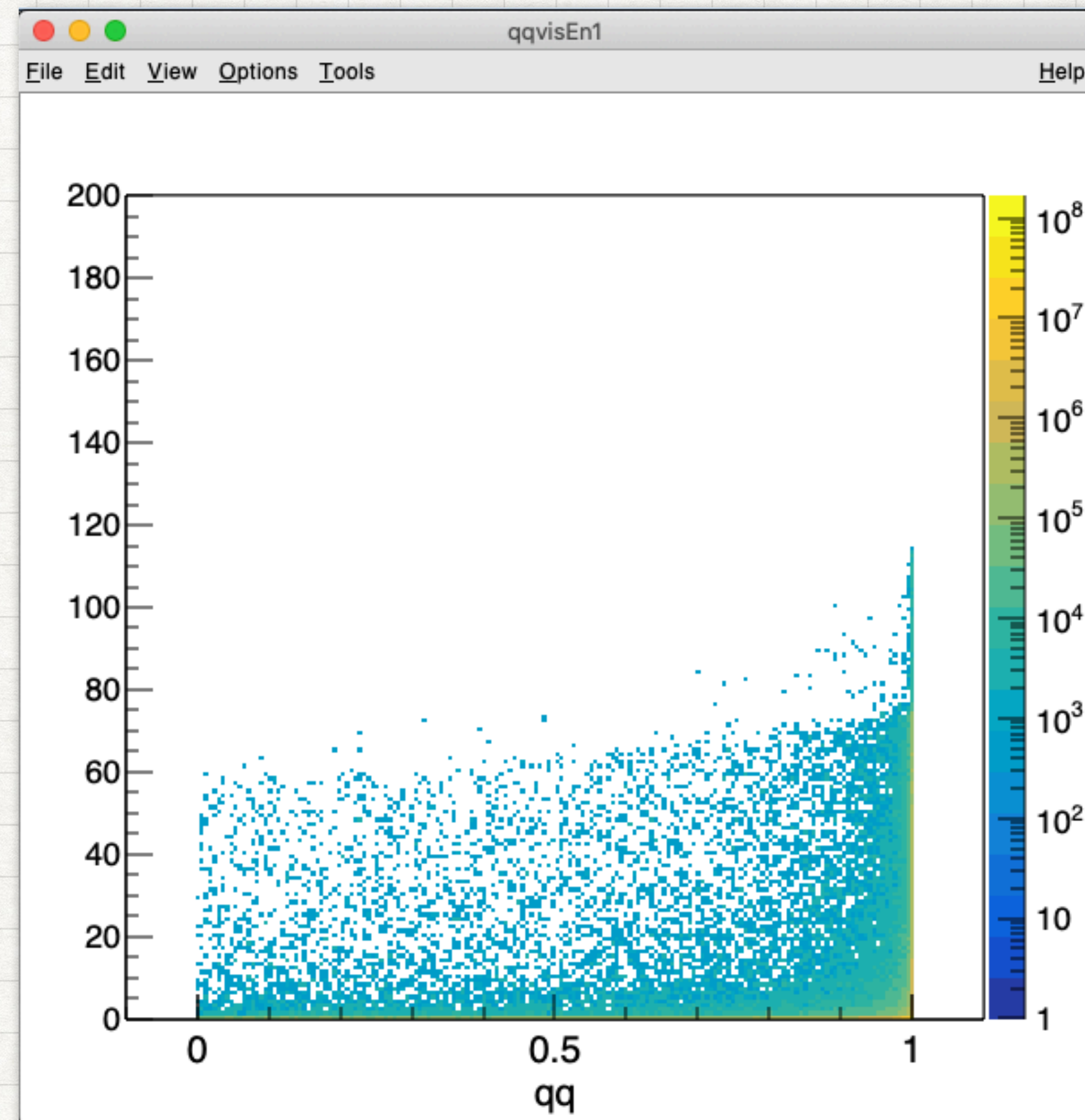
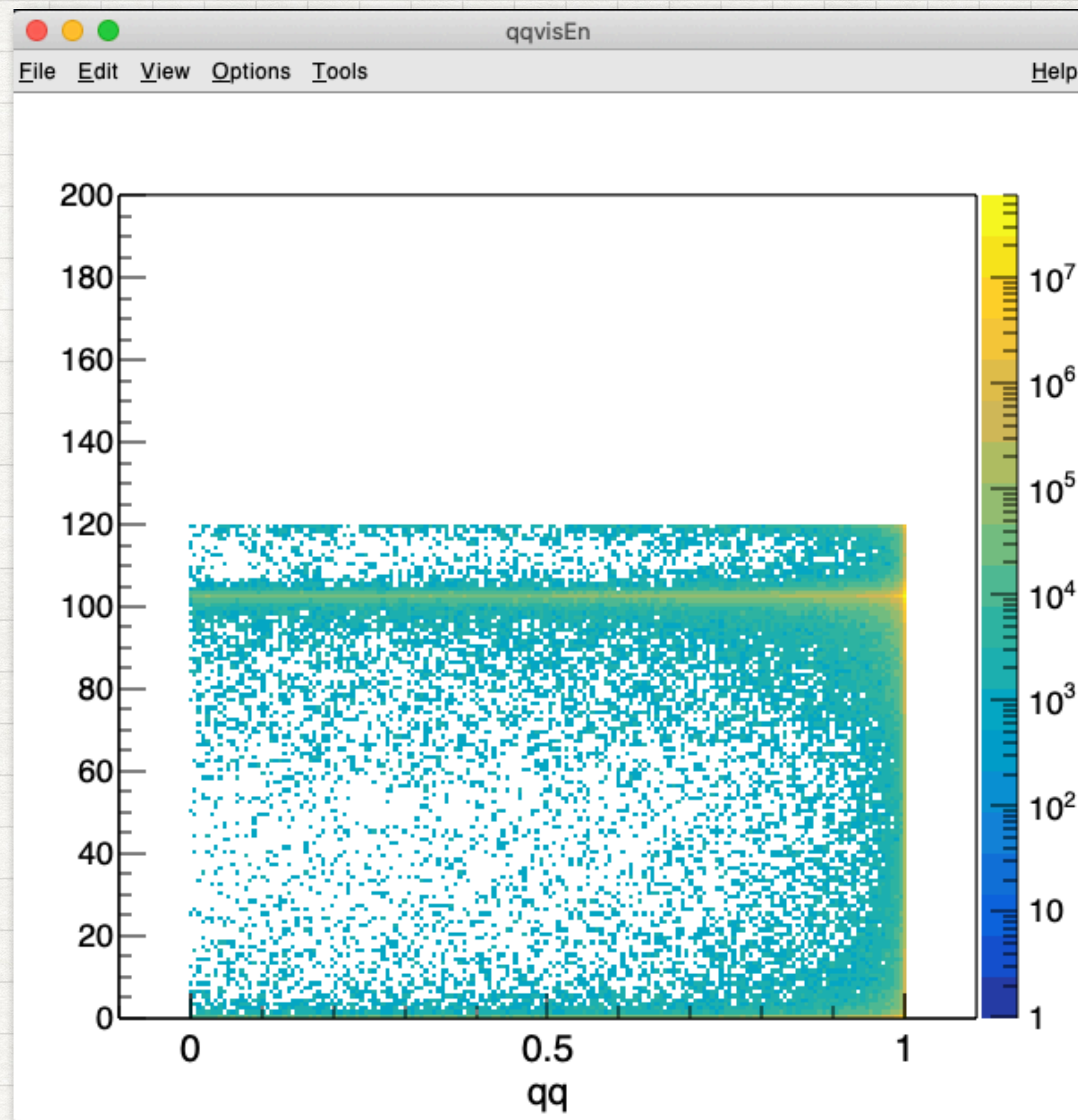




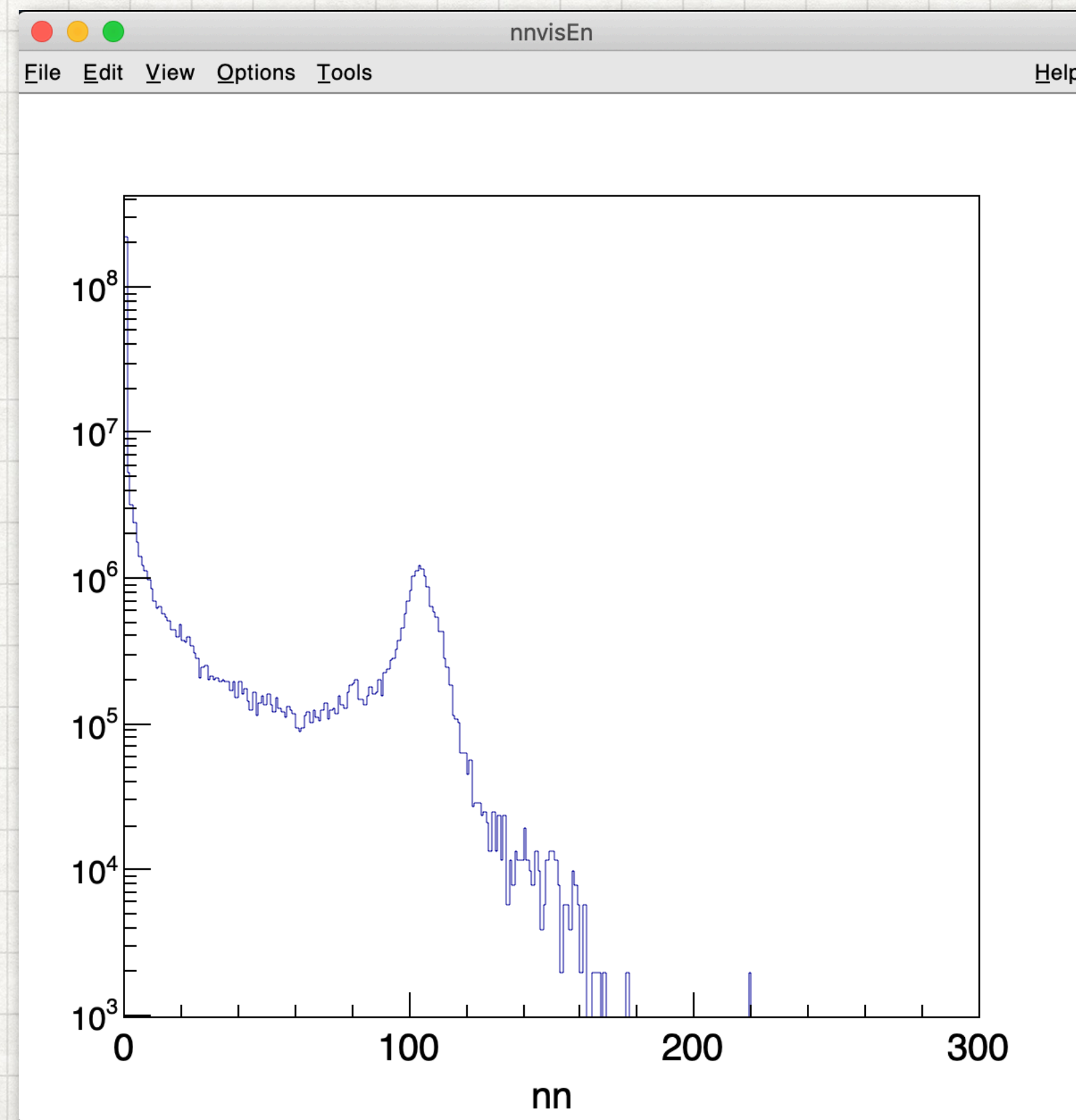
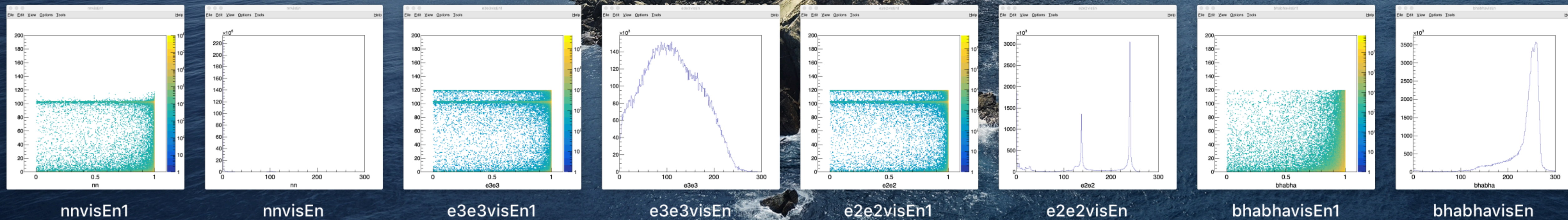


| | qqhbb | 2f | sw | sz | ww | zz | mix | zh | total bkg | SNR |
|----------------------------|--------|-----------|----------|---------|----------|---------|----------|--------|-------------|------------|
| no cut | 399278 | 722467515 | 17600511 | 8181854 | 45834349 | 5761891 | 19693128 | 629272 | 8.20168E+08 | 0.0717434 |
| multiplicity >= 27 | 399278 | 274249077 | 13188429 | 3042175 | 43745139 | 5407351 | 16291009 | 597189 | 3.5652E+08 | 0.0473162 |
| visEn >= 200 | 384854 | 114927754 | 6107576 | 1205158 | 24438010 | 3264846 | 15618337 | 274455 | 1.65836E+08 | 0.0335002 |
| LepLeadEn < 69 | 384842 | 112163085 | 1636197 | 640994 | 19610955 | 2894291 | 15570117 | 261158 | 1.52777E+08 | 0.0321582 |
| gamaLeadEn <= 60 | 384562 | 72387493 | 1296346 | 380617 | 19216297 | 2827409 | 15332890 | 258190 | 1.11699E+08 | 0.0275299 |
| hadLeadEn < 60 | 384050 | 53470804 | 1088705 | 279305 | 18677848 | 2768716 | 14961039 | 255531 | 9.15017E+07 | 0.0249595 |
| Thrust <= 0.86 | 339761 | 6687456 | 687088 | 220248 | 16969115 | 2407048 | 13792033 | 236943 | 4.09996E+07 | 0.0189238 |
| sumTwob >= 1.3 | 285171 | 956442 | 744 | 32624 | 75019 | 791188 | 85271 | 60210 | 2.00135E+06 | 0.00530252 |
| 96.5 <= massBoson1 < 147.5 | 204734 | 358728 | 0 | 6593 | 20567 | 235042 | 26605 | 38747 | 686282 | 0.00461055 |
| massBoson2 >= 74.5 | 160870 | 83433 | 0 | 3862 | 10220 | 133287 | 14137 | 27662 | 272601 | 0.00409265 |





横轴 ISR $l\cos\theta_{\text{eta}}$, 纵轴 ISR energy, 左边是高能ISR, 右边是低能ISR
 可以解释上页slide中qq visible energy 的两个峰



上图是所有两费米子visible energy
 以及
 高能ISR与其 $|\cos\theta_{\text{et}}|$ 的关系
 左图是 $ee \rightarrow nn$ visible energy取log后的图