Vertexing and flavour tagging using Conformal tracking

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CLIC detector Software Meeting

21/11/2017

Software and samples

1. ILCSoft 09-11-2017

2. CLIC_o3_v13

3. Dijet samples at 500 GeV (20º-90º) -> at 10º performance severely degraded

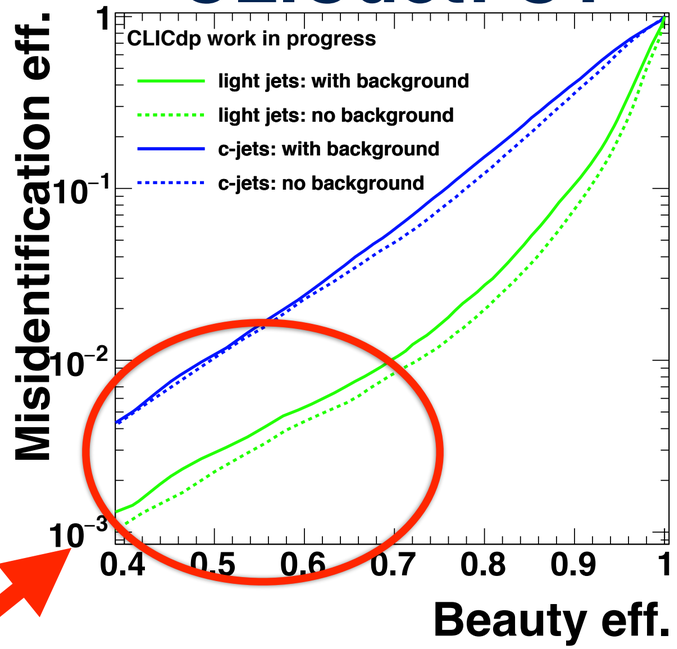
- e+e- -> bb (80.000 events)
- e+e- -> cc (80.000 events)
- e+e- -> qq (q= uds) (80.000 events)

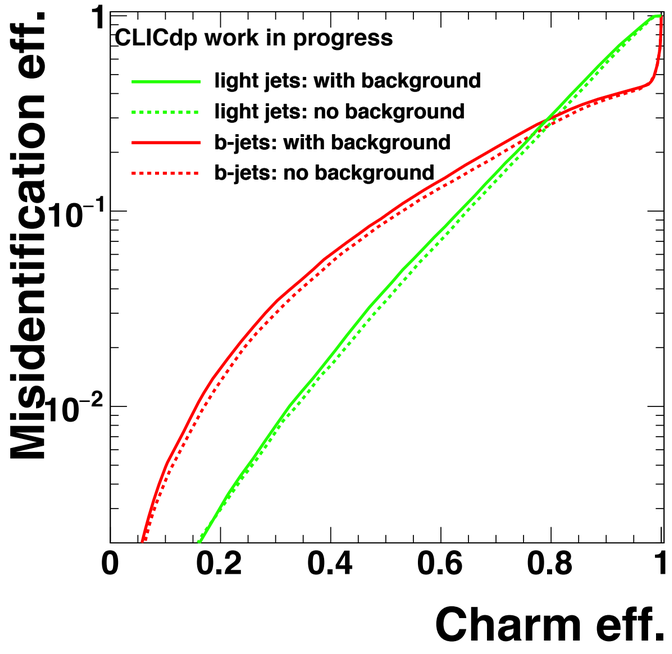
4. Conformal tracking version included since the ILCSoft released on 20-09-2017

CLICdet vs CLIC_SiD

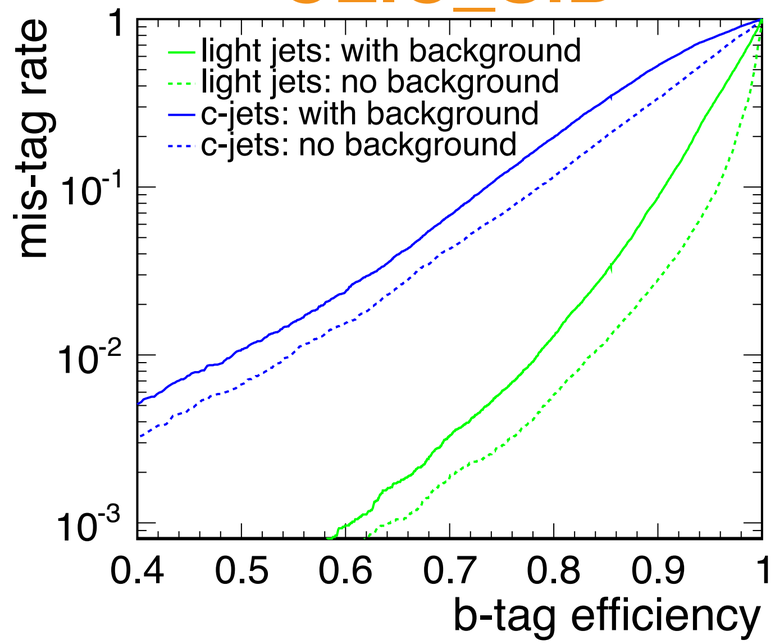
- CLIC_SiD: e+e− → qqvv events with a mean jet energy of 130 GeV
- Generally comparable performance to CLIC_SiD with the realistic Conformal Tracking
- Except for b-eff with light jets background. Significant degradation below b-eff = 0.8
- The impact of gg-> hadrons background seems lower for CLICdet, at least visually

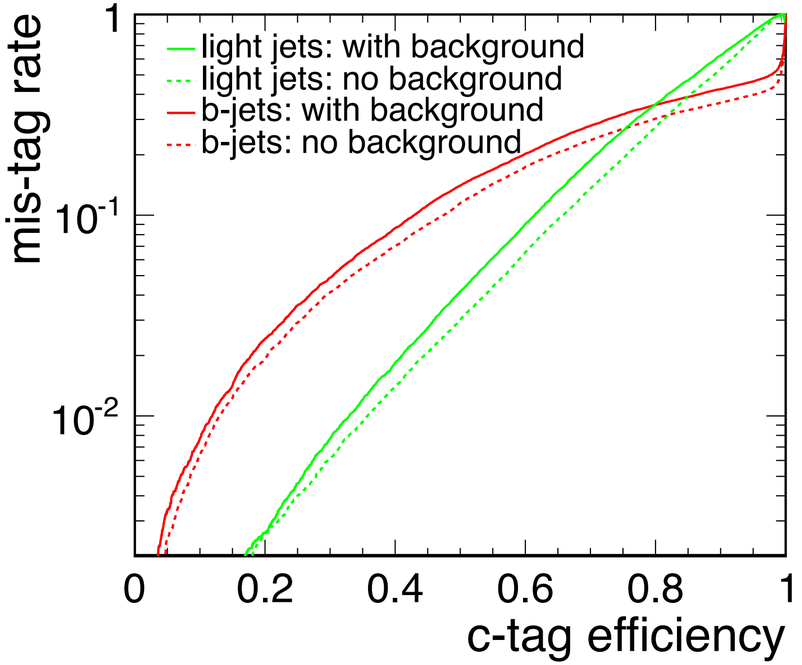
CLICdet: CT



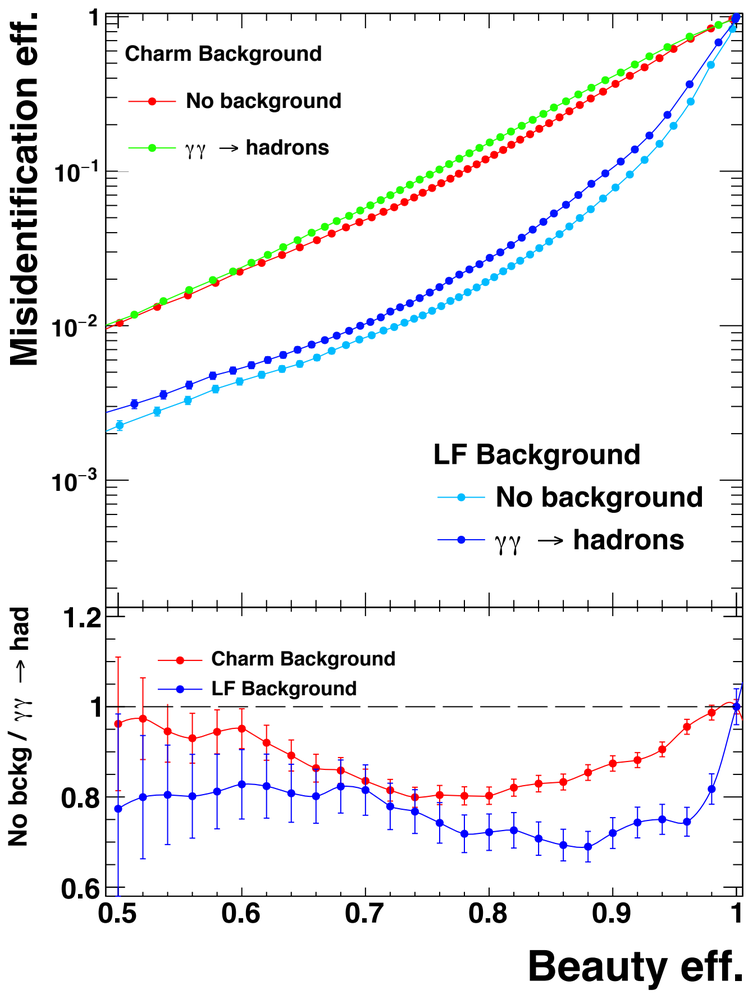


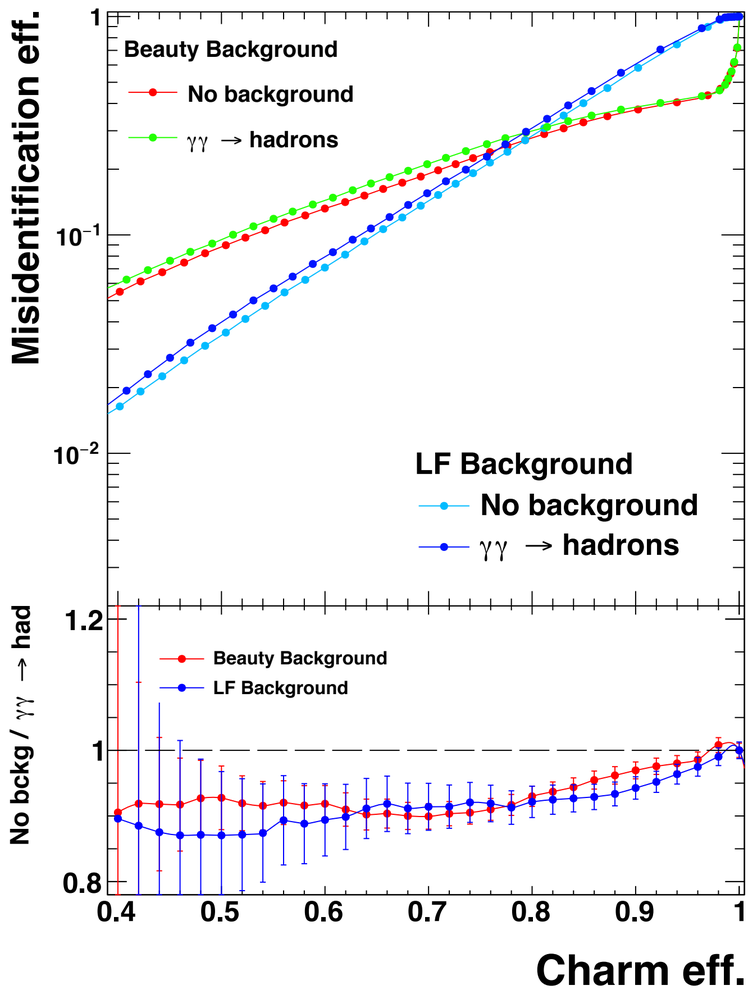
CLIC_SiD





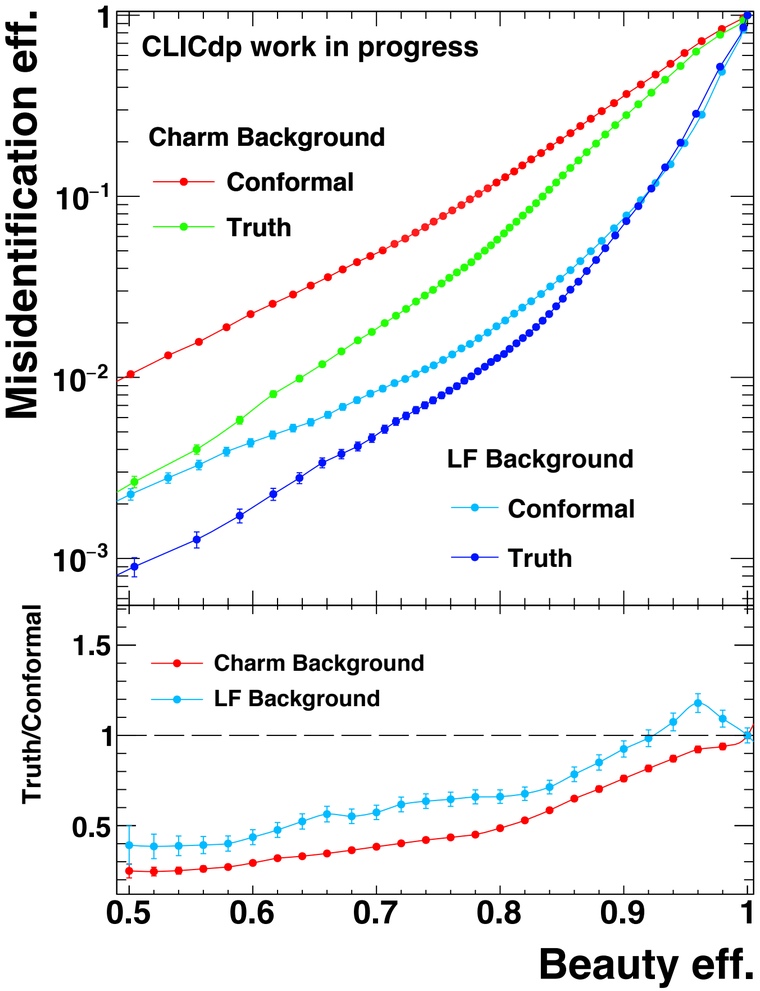
Flavour tagging - CT - Background

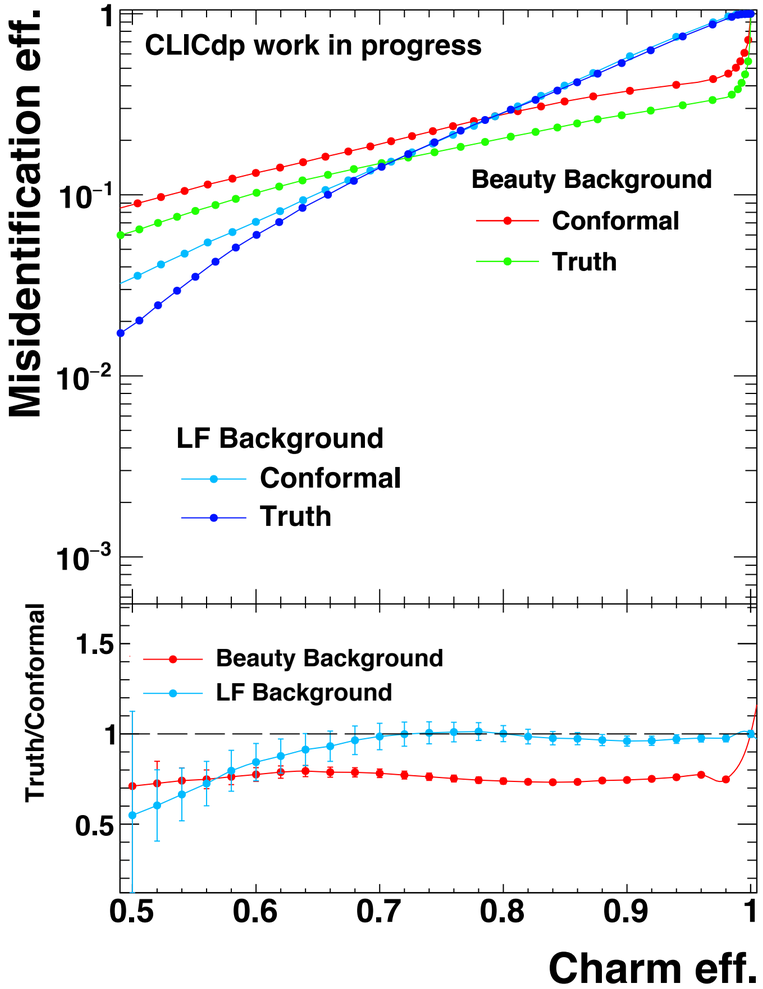




- b-tagging: γγ->hadrons increases the miss. efficiency up to a 30% for light flavour background
- c-tagging: γγ->hadrons has a lower impact here, the maximum variation in the miss. efficiency is ~10%

Flavour tagging - CT vs TT

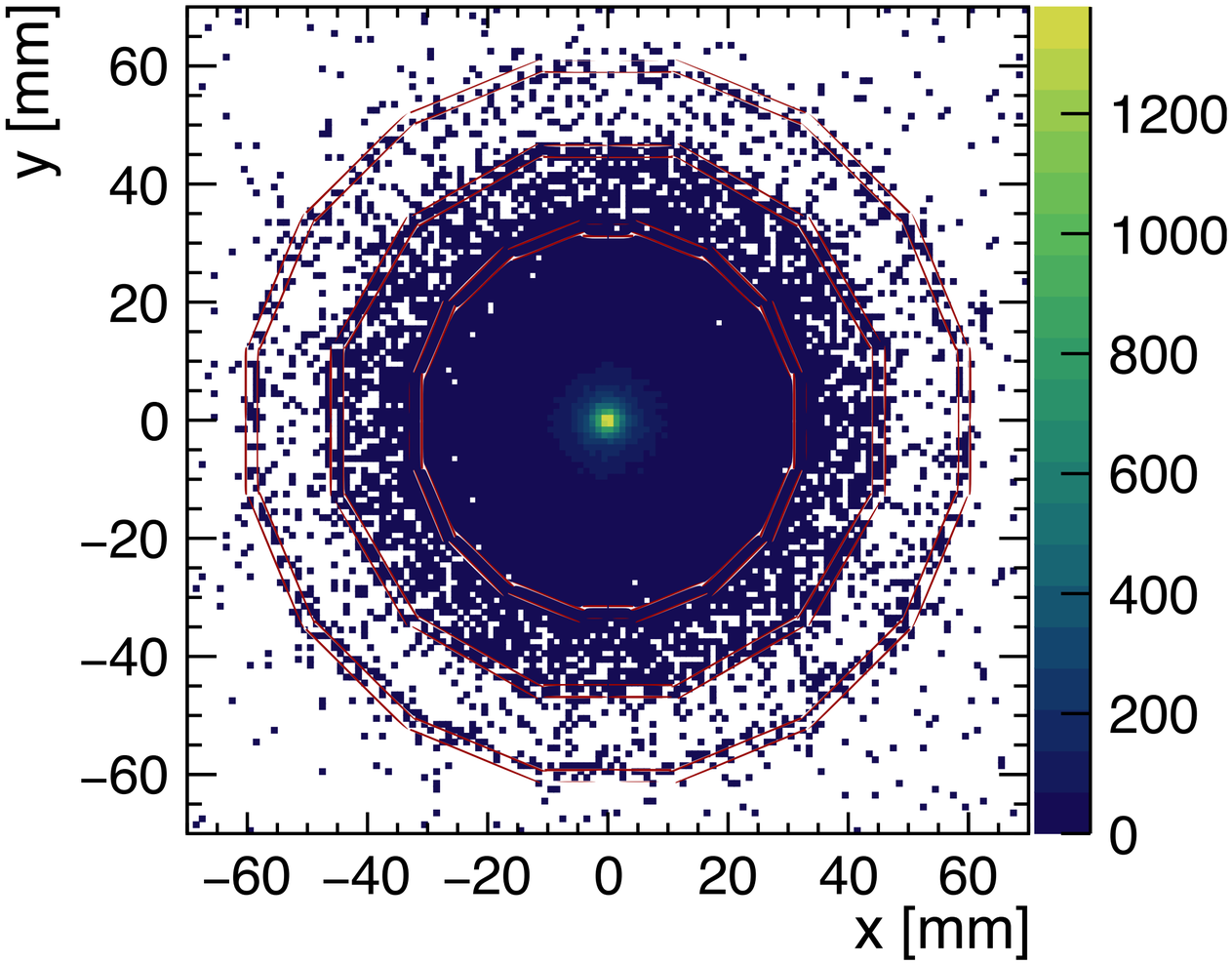




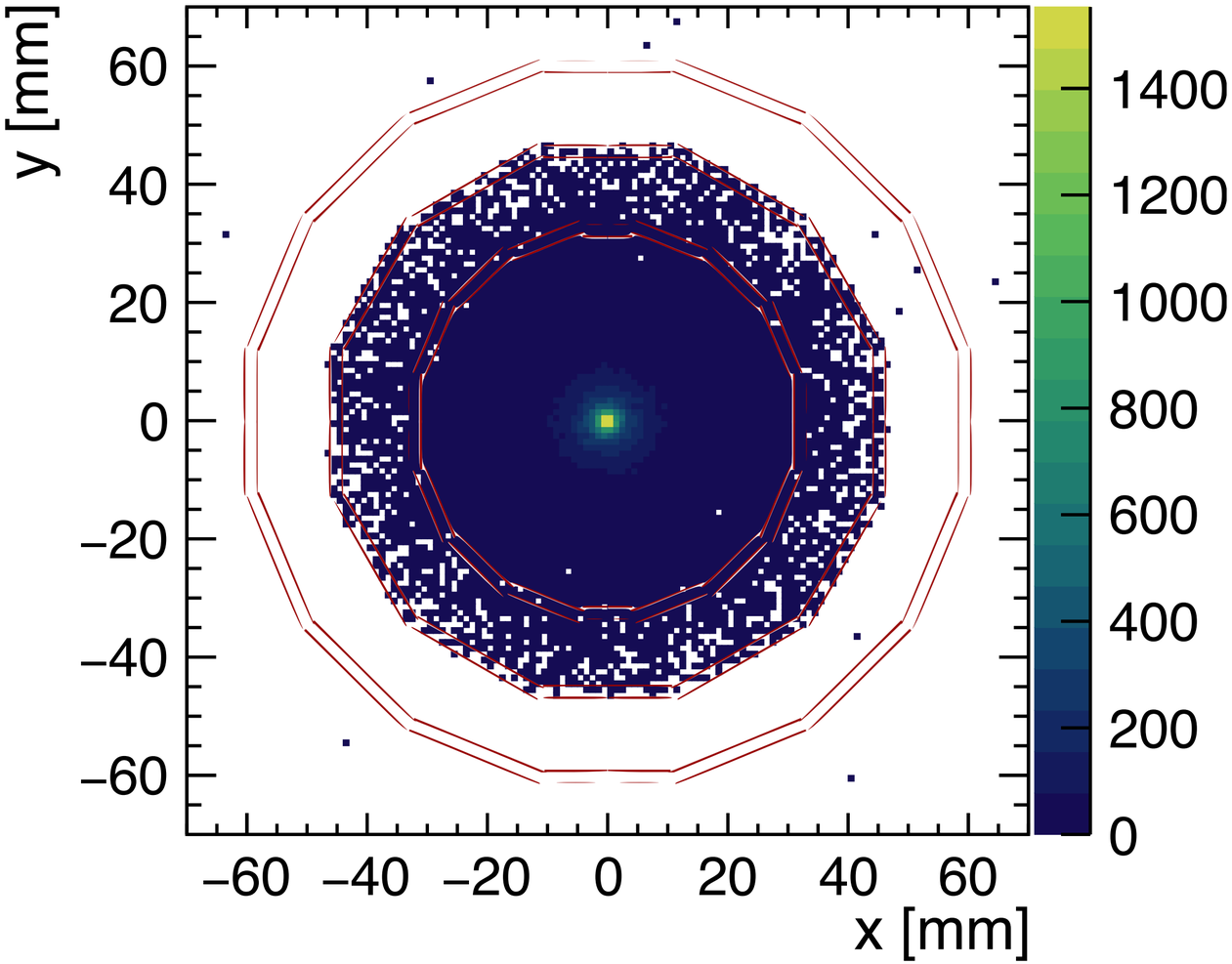
- b-tagging: up to a 60-80% rise of the miss. efficiency for CT for b-eff ~0.5
- c-tagging: a fairly constant 30% difference for beauty background. Equal performance for c-eff =>0.7

Secondary Vertex Position - XY Plane

e+e- -> bb at 500GeV [20°,30°,…,90°] w/o background



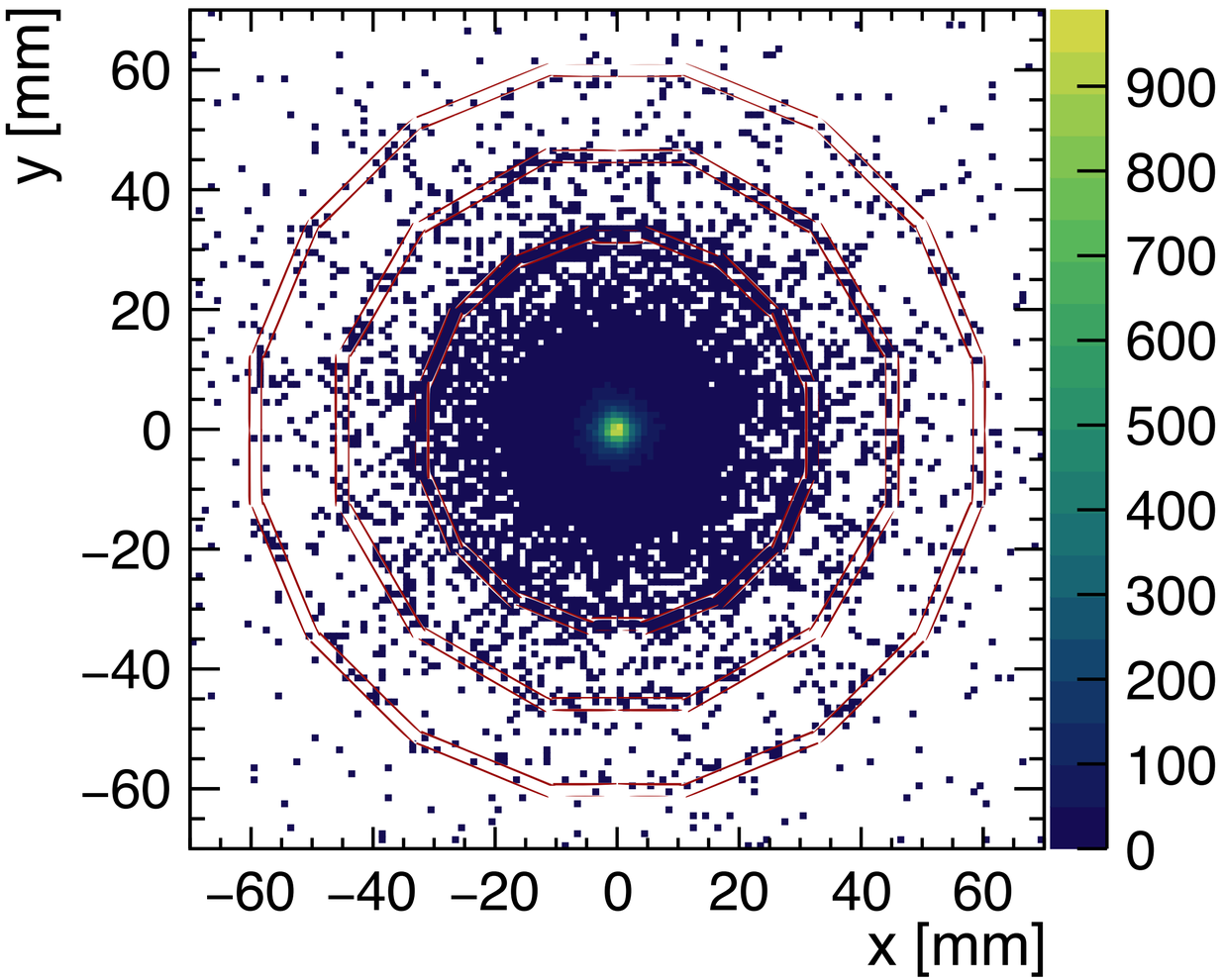
CONFORMAL



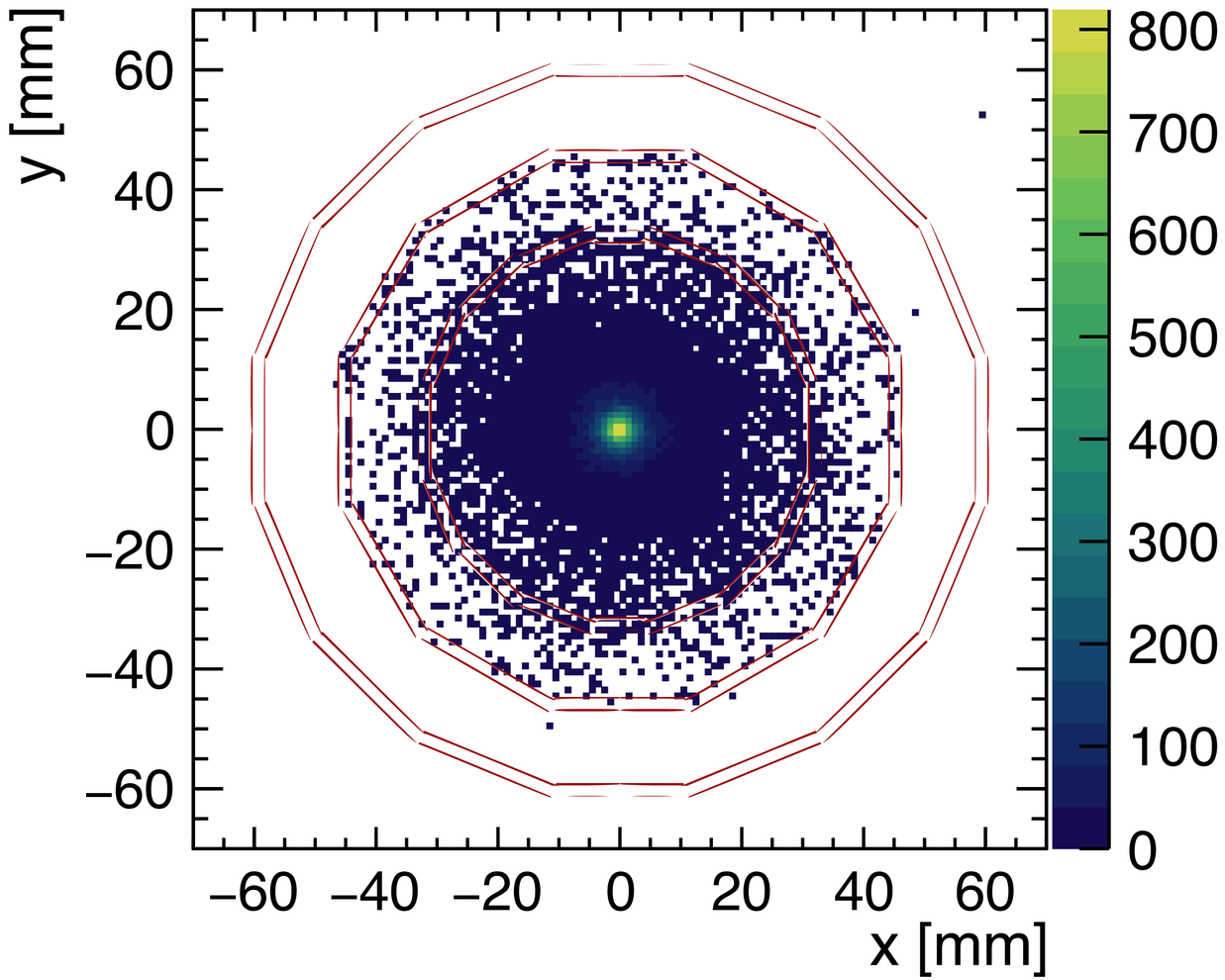
TRUTH

Secondary Vertex Position - XY Plane

e+e- -> cc at 500GeV [20°,30°,…,90°] w/o background



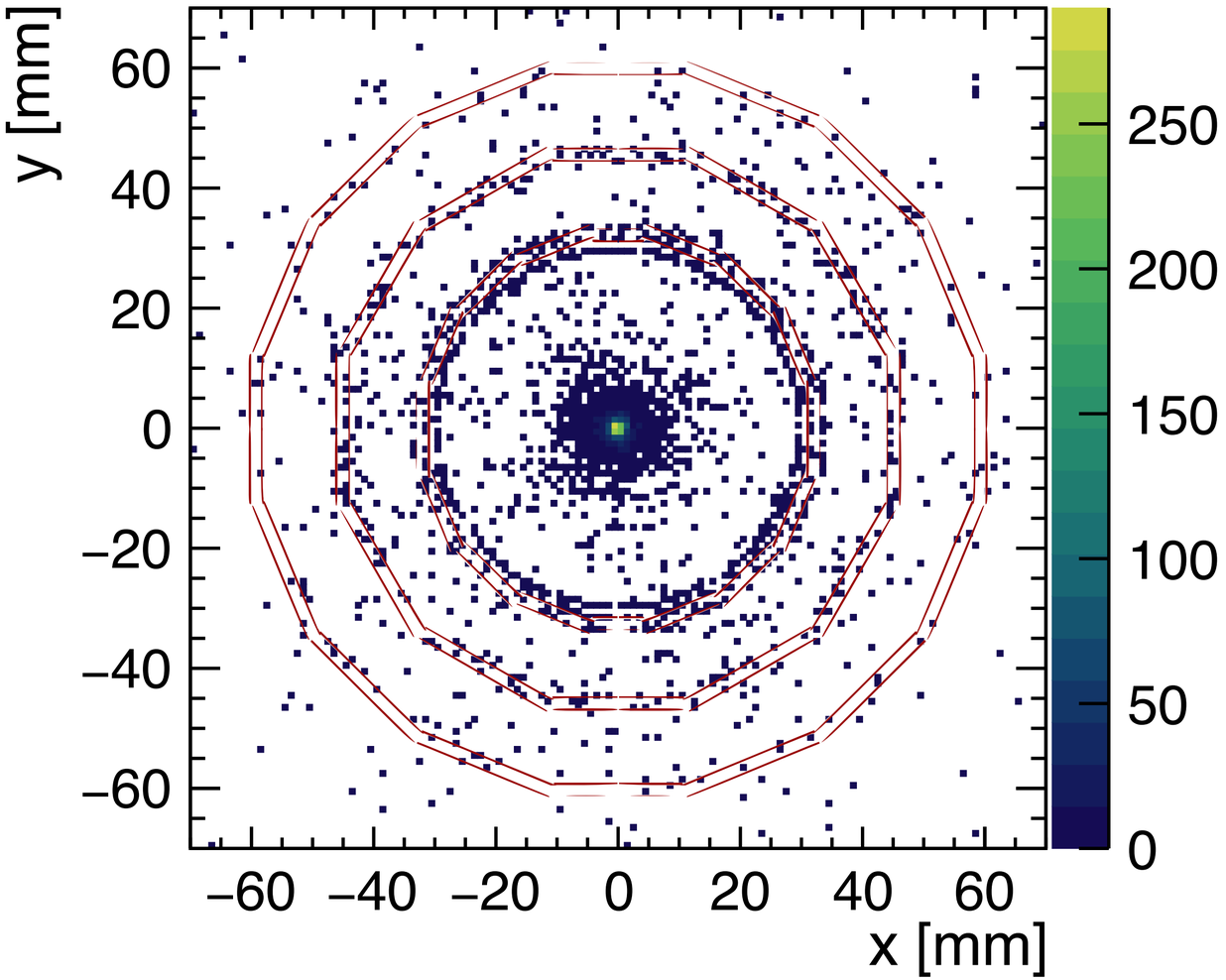
CONFORMAL



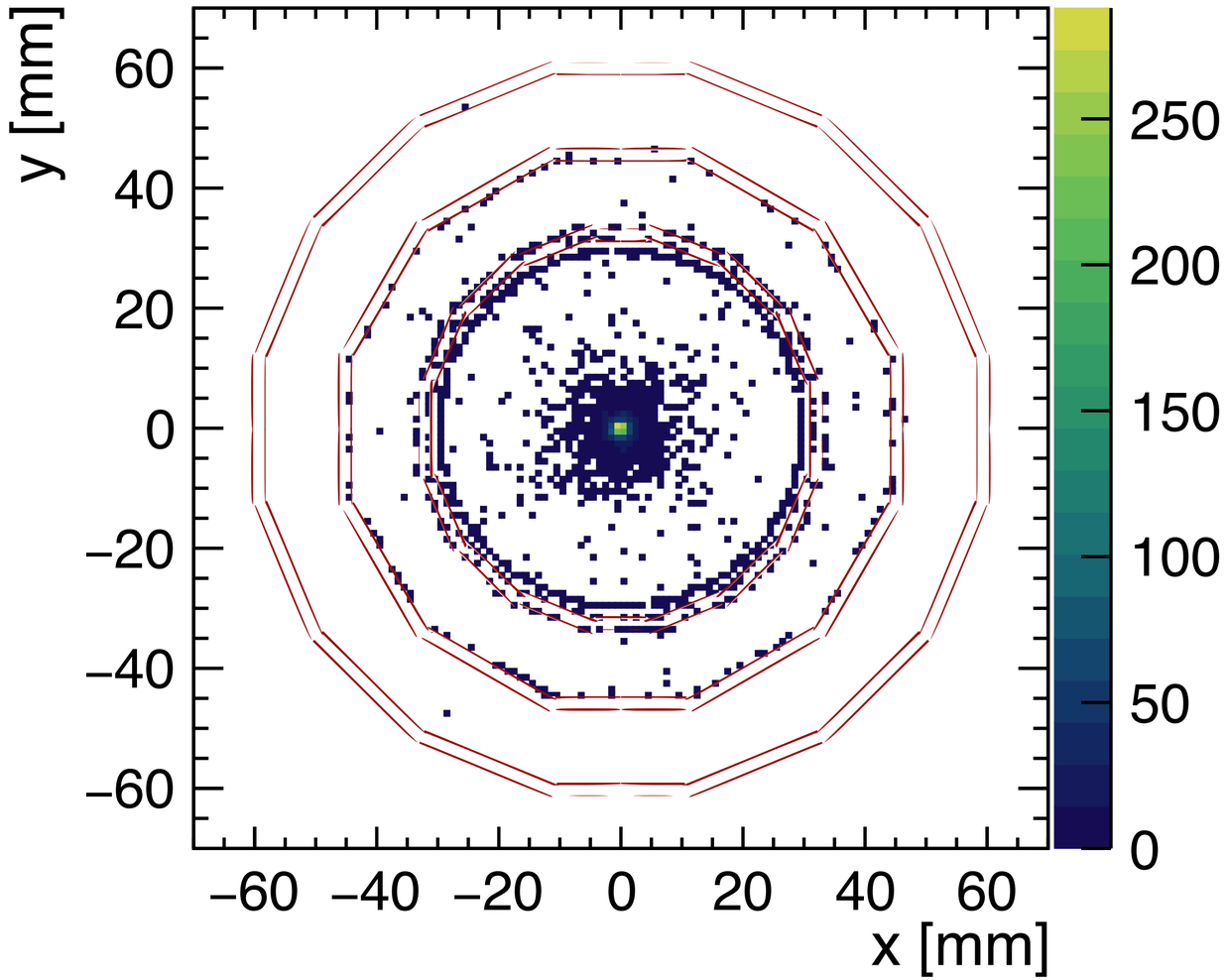
TRUTH

Secondary Vertex Position - XY Plane

e+e- -> qq at 500GeV [20º,30º,…,90º] w/o background

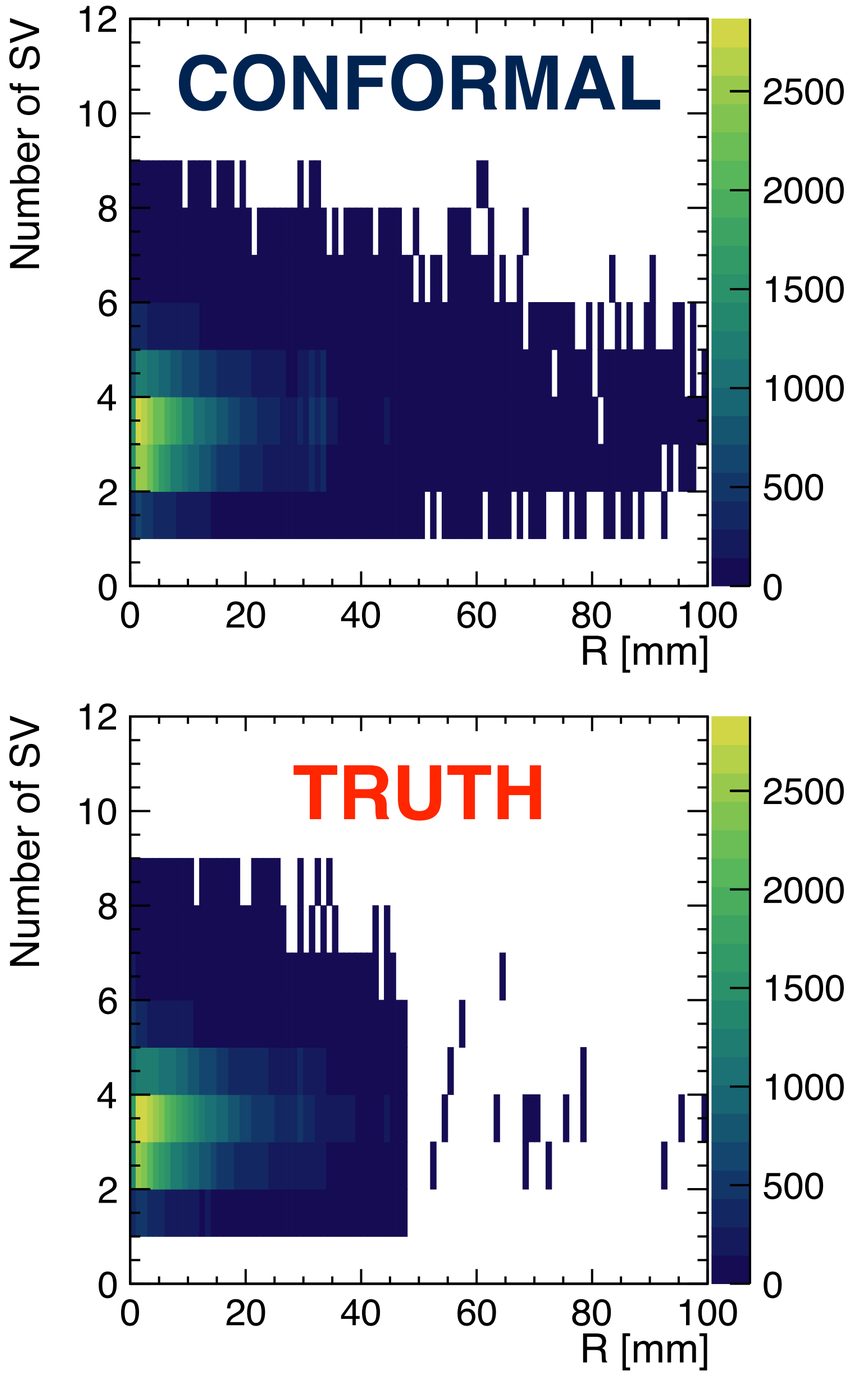


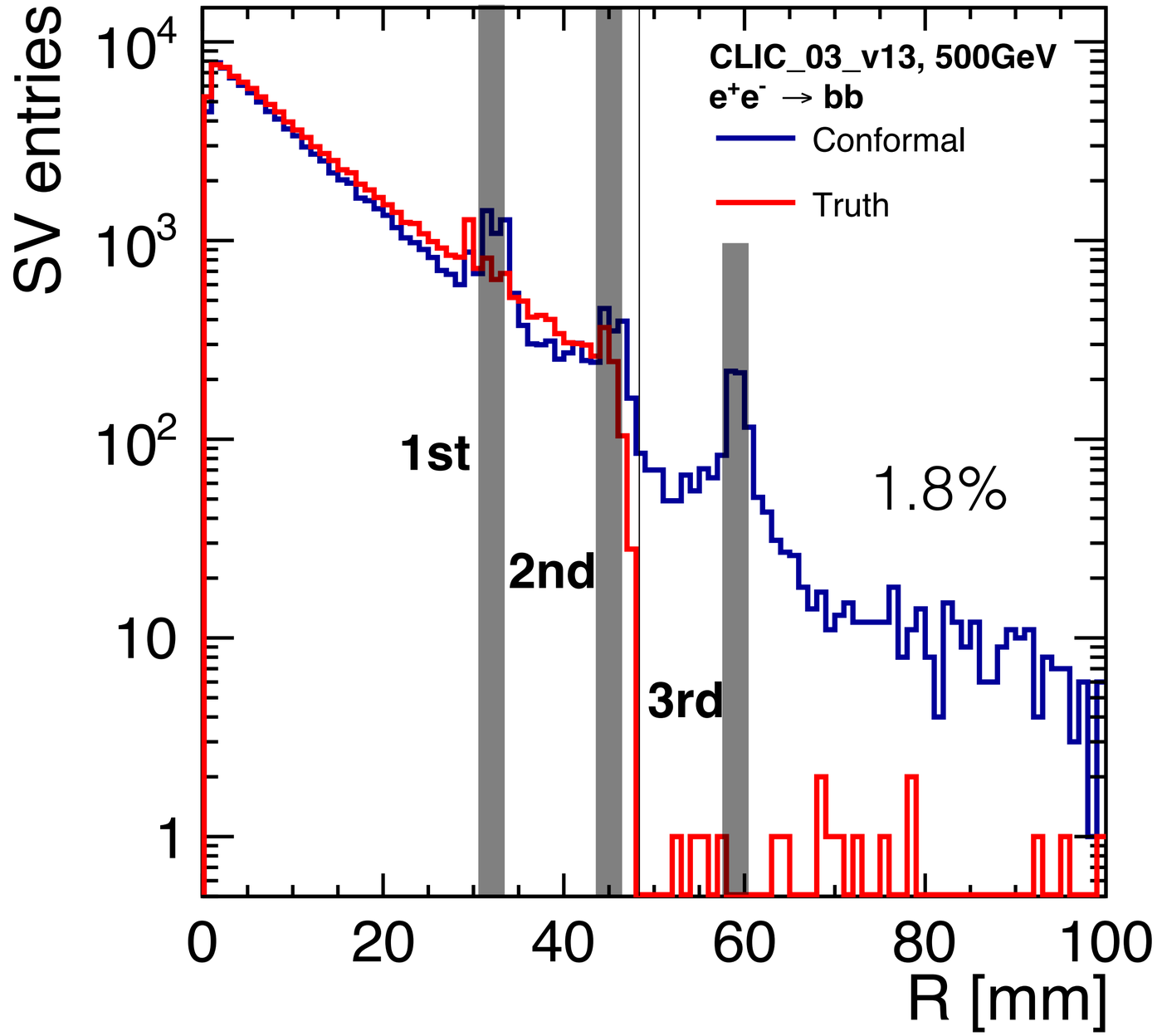
CONFORMAL



TRUTH

Number of SV vs Radius





Number of SV vs Radius