background study of external bremsstrahlung produced in the ALICE 3 setup

electron veto

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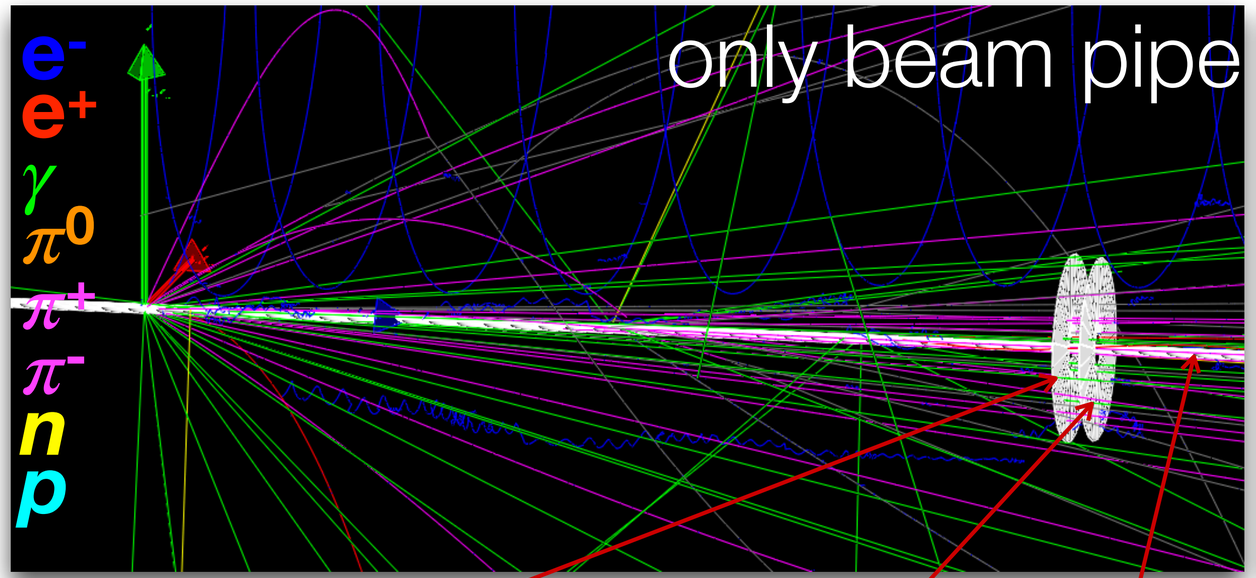
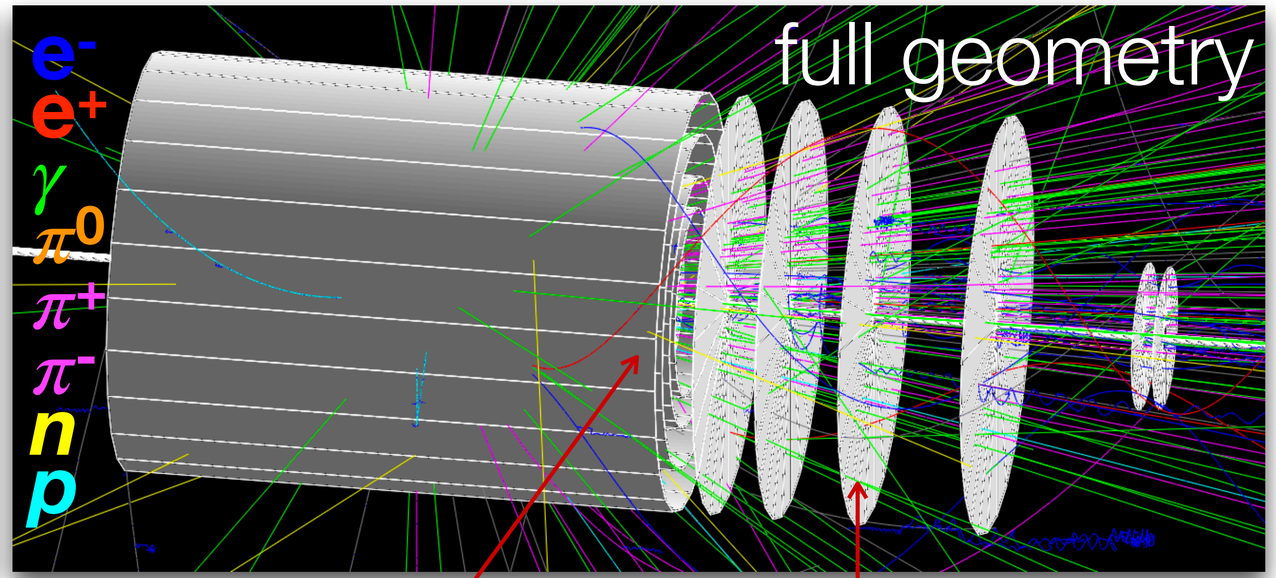
reminder: g4me detector setup for ALICE3-workshop





converter layer (vacuum)
—> testing what enters FCT

beam pipe

12 tracker layers

10 end caps

one silicon layer (active device)
—> currently a prerequisite for g4me to work

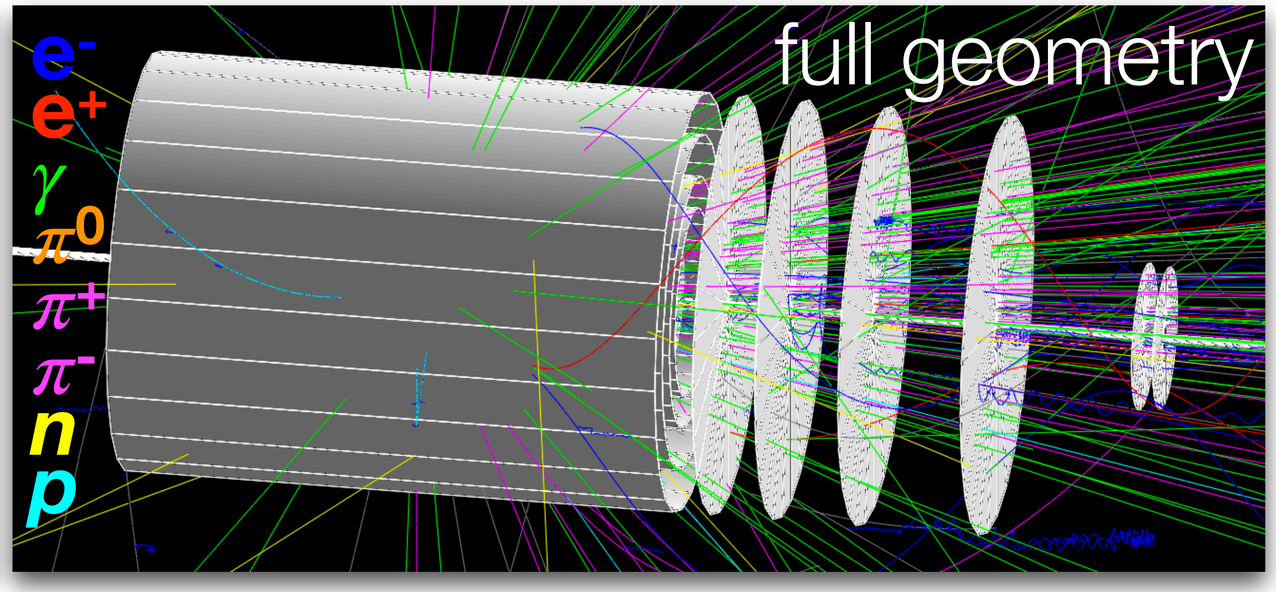
layer	radius (m)	length (m)	material (% X/X0)	resolution (um)
0	0.0050	2 x 0.15	0.1	2.5 (1.0?)
1	0.0120	2 x 0.15	0.1	2.5 (1.0?)
2	0.0250	2 x 0.15	0.1	2.5 (1.0?)
3	0.0375	2 x 0.62	0.1	2.5 (1.0?)
4	0.0700	2 x 0.62	1.0	10
5	0.1200	2 x 0.62	1.0	10
6	0.2000	2 x 0.62	1.0	10
7	0.3000	2 x 0.62	1.0	10
8	0.4500	2 x 1.32	1.0	10
9	0.6000	2 x 1.32	1.0	10
10	0.8000	2 x 1.32	1.0	10
11	1.0000	2 x 1.32	1.0	10

Table 2: Barrel geometry

disk	z (m)	R_i (m)	R_o (m)	material (% X/X0)	resolution (um)
0	0.16	0.005	0.03	1.0	10
1	0.20	0.005	0.03	1.0	10
2	0.24	0.005	0.03	1.0	10
3	0.77	0.005	0.35	1.0	10
4	1.00	0.005	0.35	1.0	10
5	1.22	0.005	0.35	1.0	10
6	1.50	0.005	1.00	1.0	10
7	1.80	0.005	1.00	1.0	10
8	2.20	0.005	1.00	1.0	10
9	2.79	0.005	1.00	1.0	10

Table 3: Endcap geometry

residual events after electron veto



3 < η < 5: 3530 / 20000 ≈ 17.7%

3 < η < 4: 4674 / 20000 ≈ 23.4%

4 < η < 5: 8885 / 20000 ≈ 44.4%

3 < η < 5: 1413 / 20000 ≈ 7.1%

3 < η < 4: 2115 / 20000 ≈ 10.5%

4 < η < 5: 6029 / 20000 ≈ 30.1%

on the following slides the background from external bremsstrahlung with and without electron veto is compared for the two scenarios (left: only beam pipe and right: full geometry) and for the three different pseudorapidity ranges

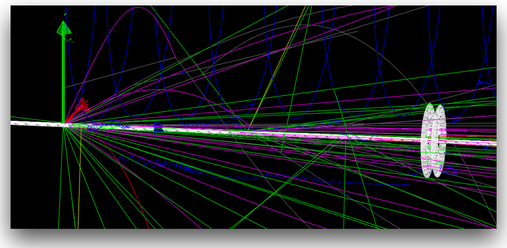
side note: the naming switches from soft photon expectation to inner Bremsstrahlung and to label in the plots the setup name “only beam pipe” / “full setup” was added

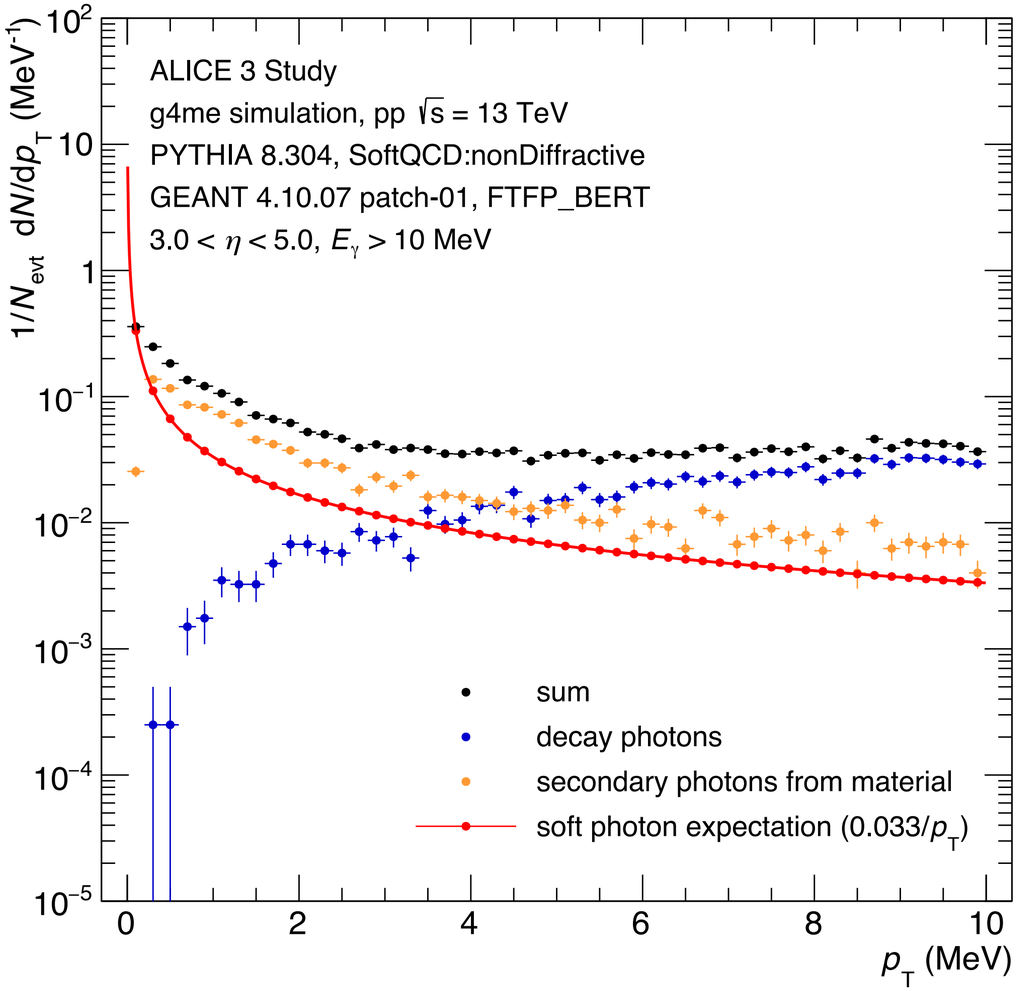
comparison of background for two scenarios:

$3 < \eta < 5$

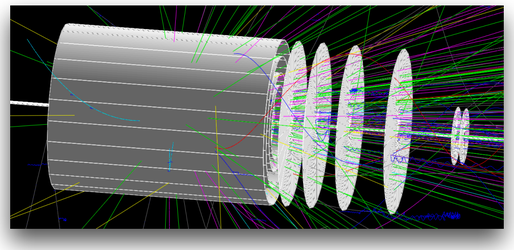
yield

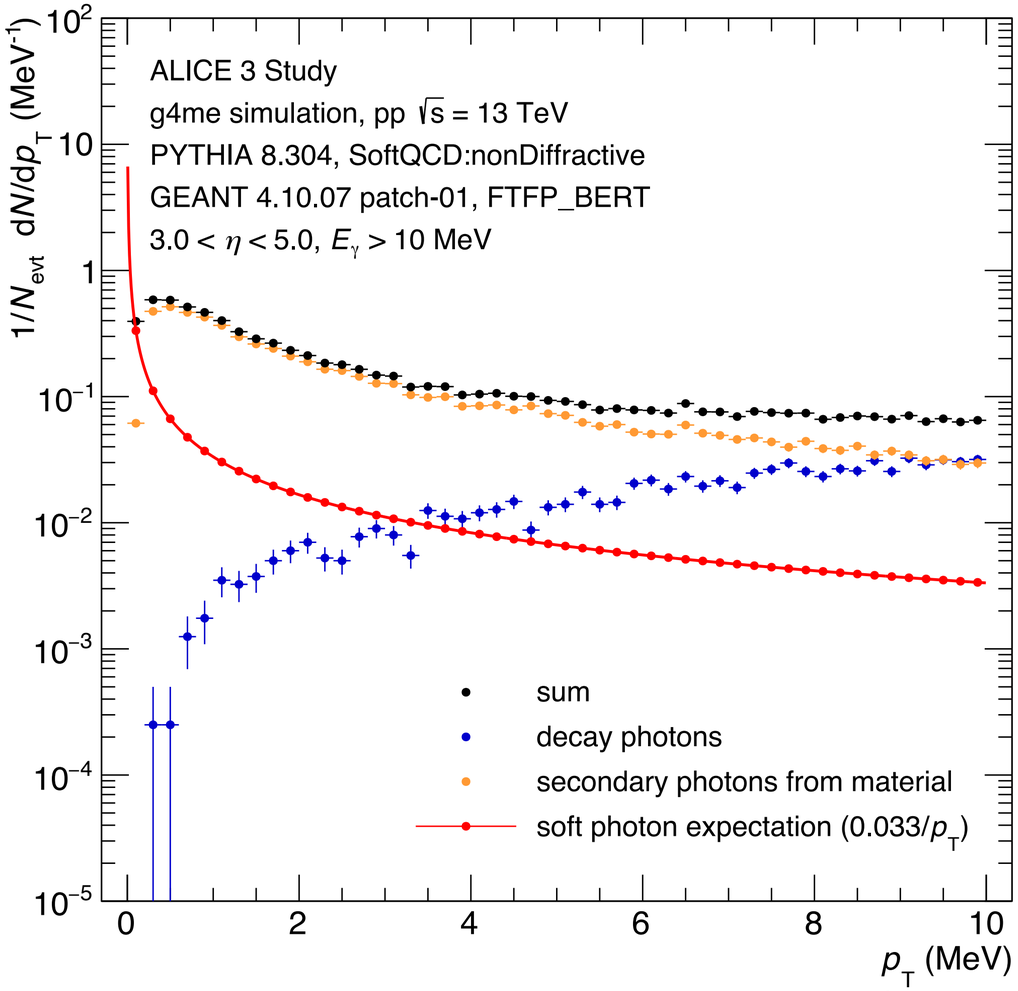
1. only beam pipe





2. full geometry





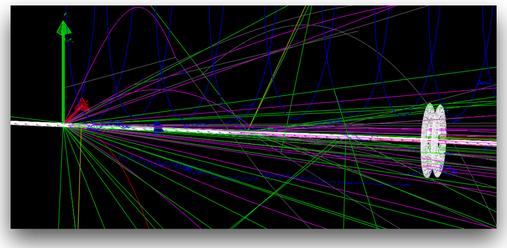
comparison of background for two scenarios:

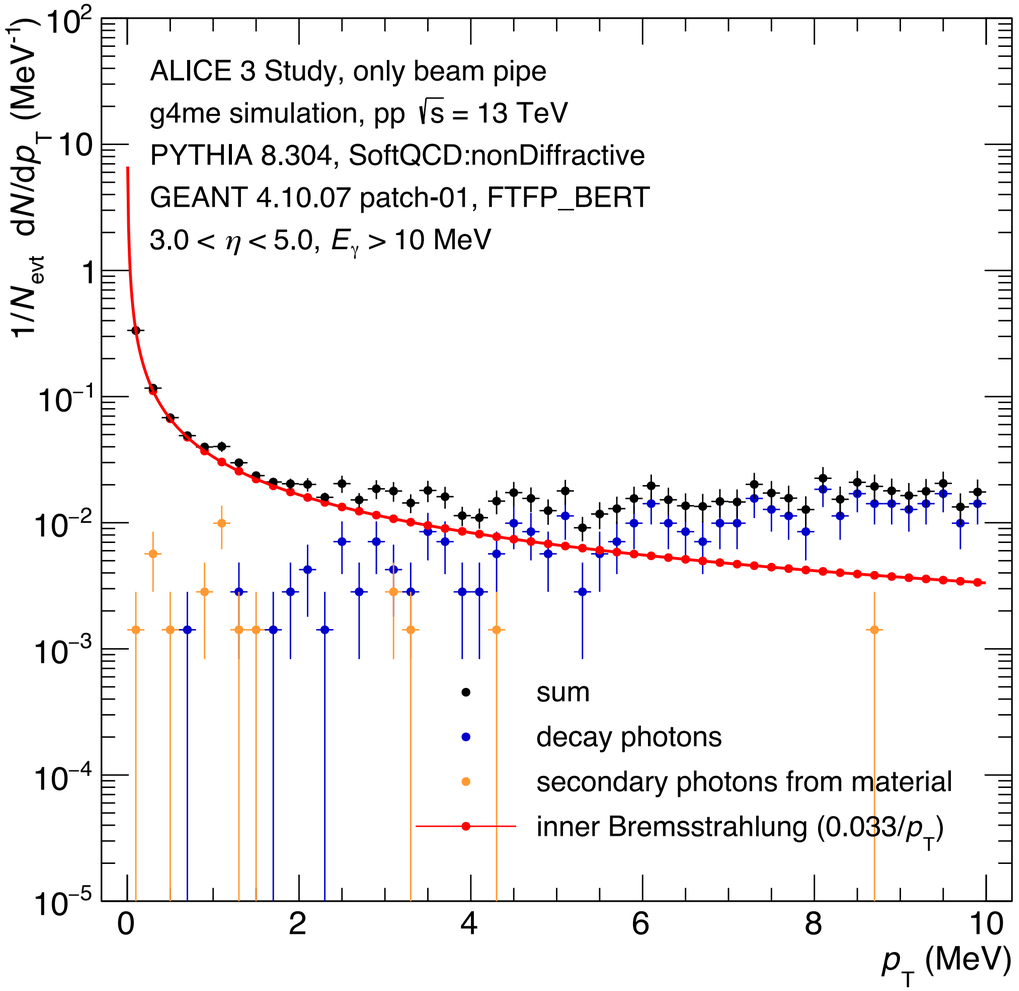
3 < η < 5

yield

with electron veto

1. only beam pipe





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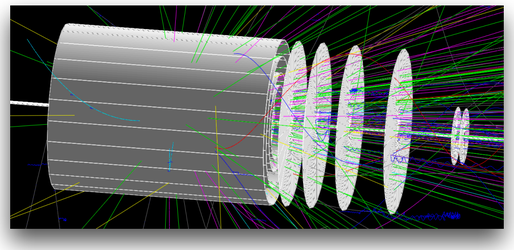
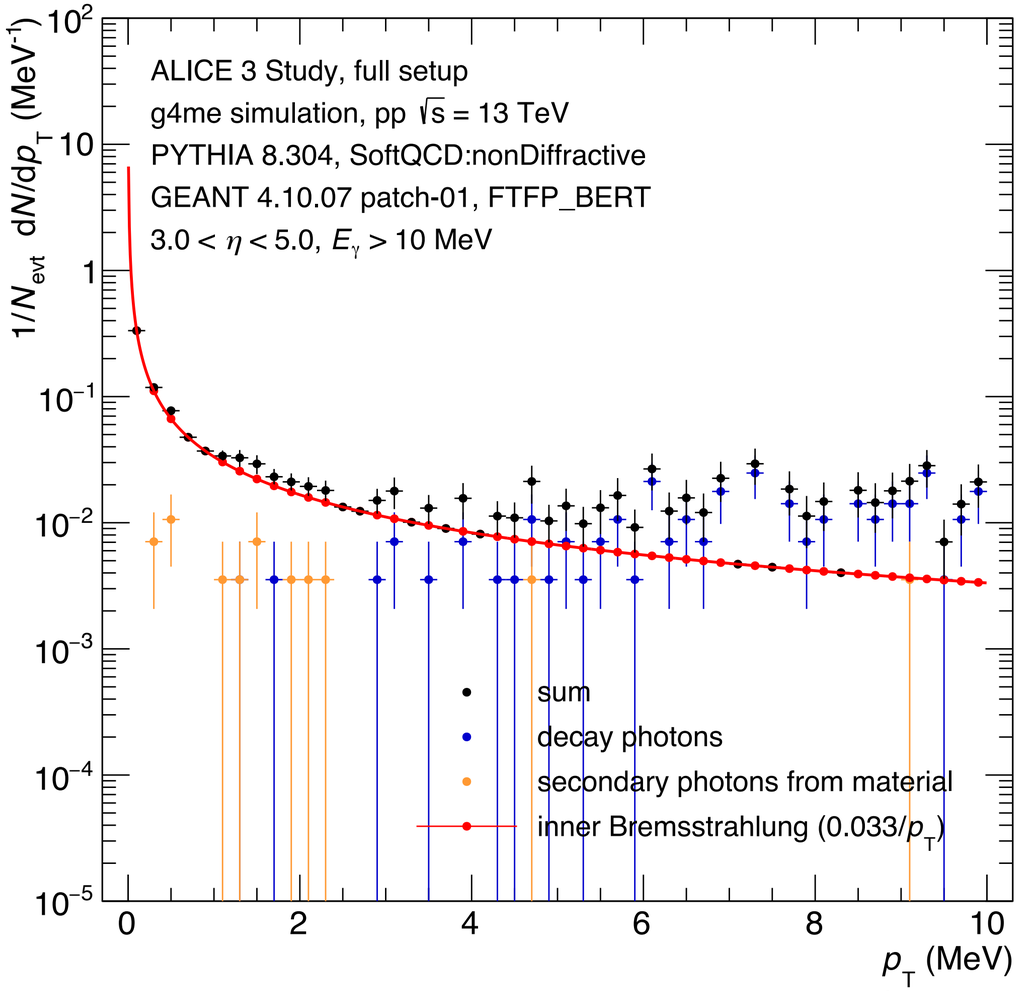


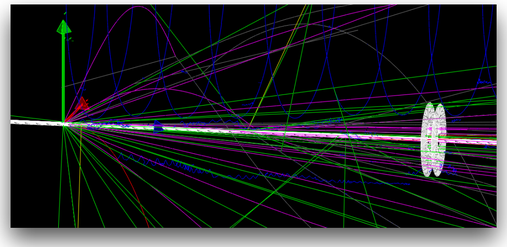


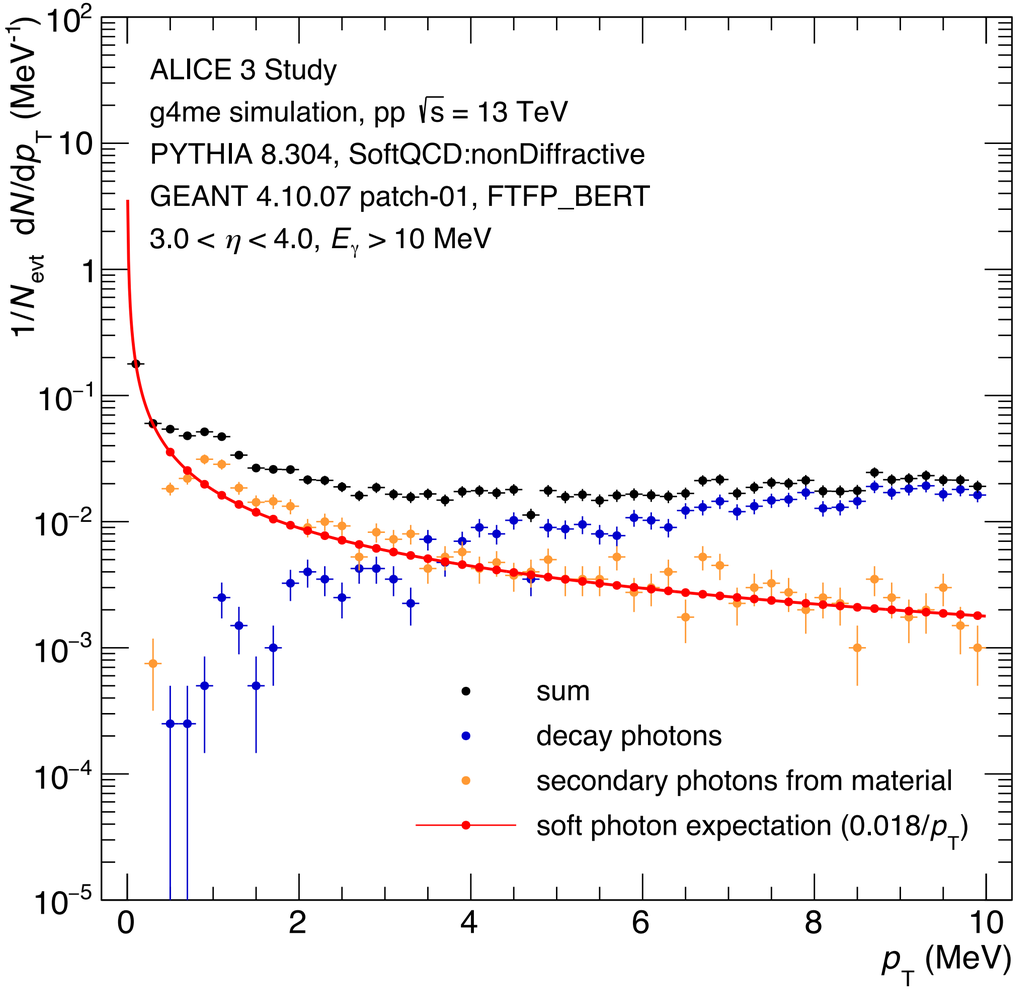
comparison of background for two scenarios:

$3 < \eta < 4$

yield

1. only beam pipe





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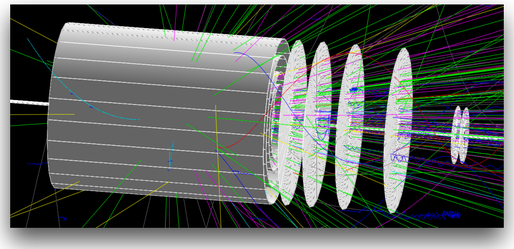

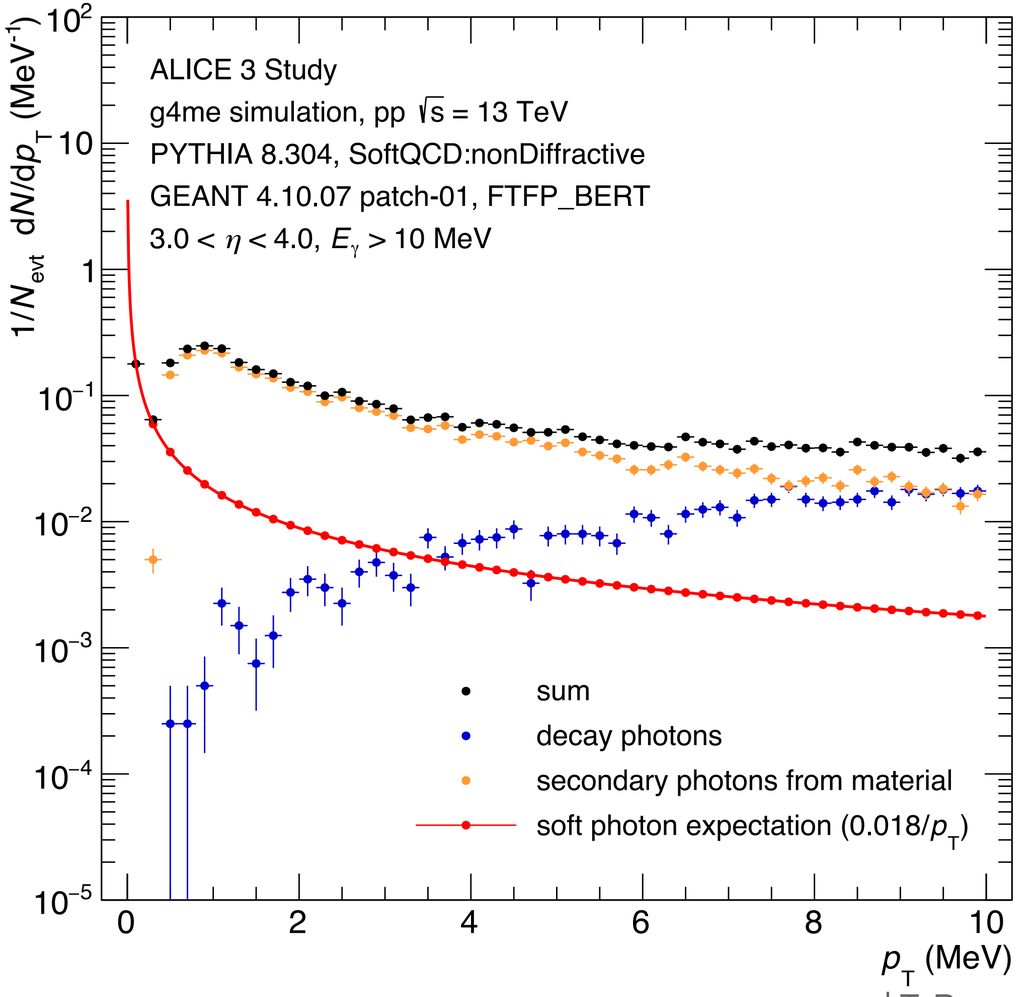

comparison of background for two scenarios:

$3 < \eta < 4$

yield

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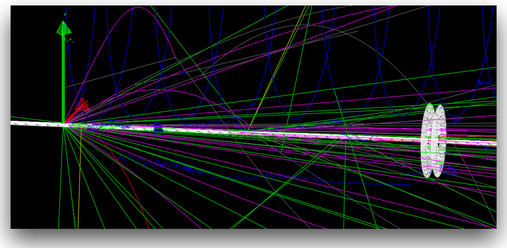

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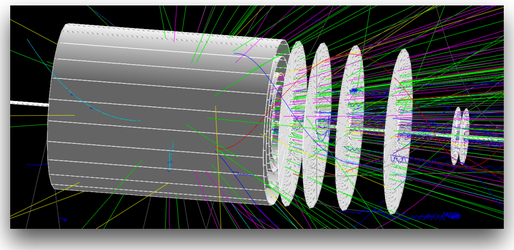
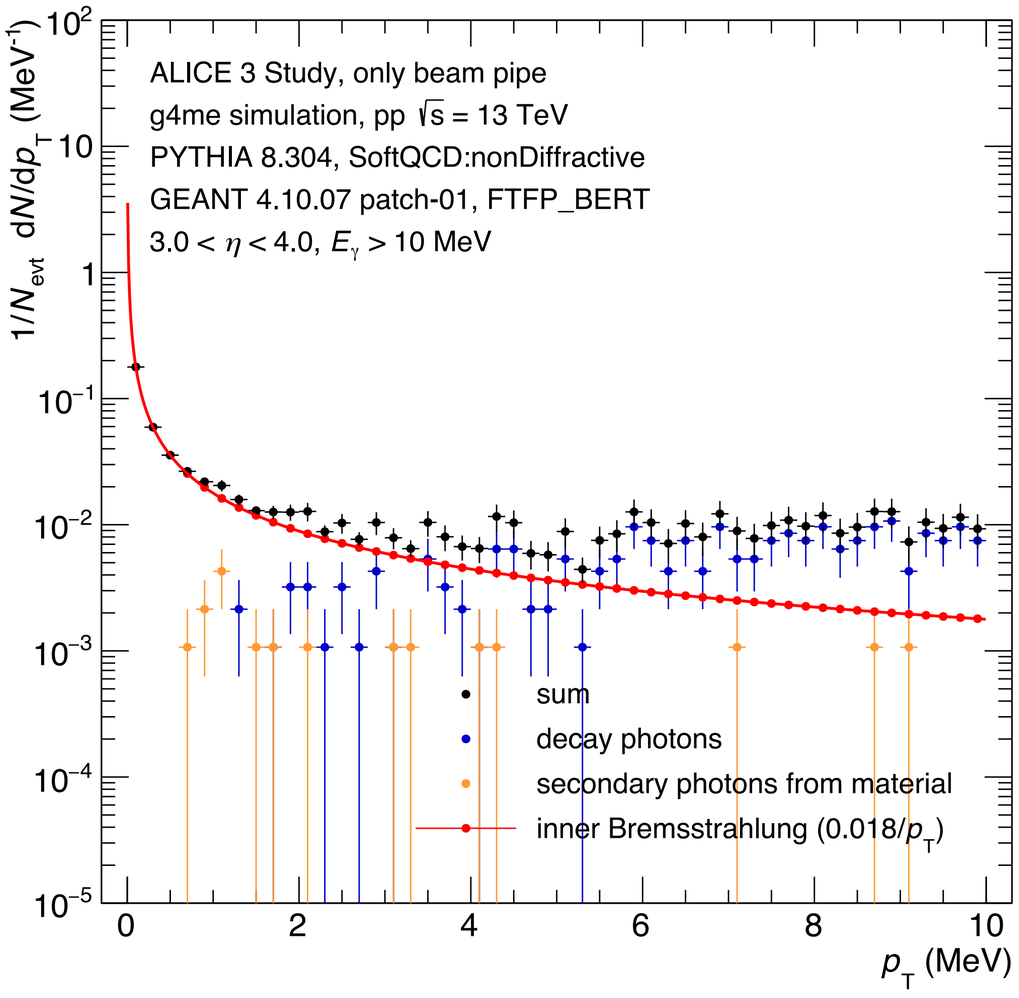
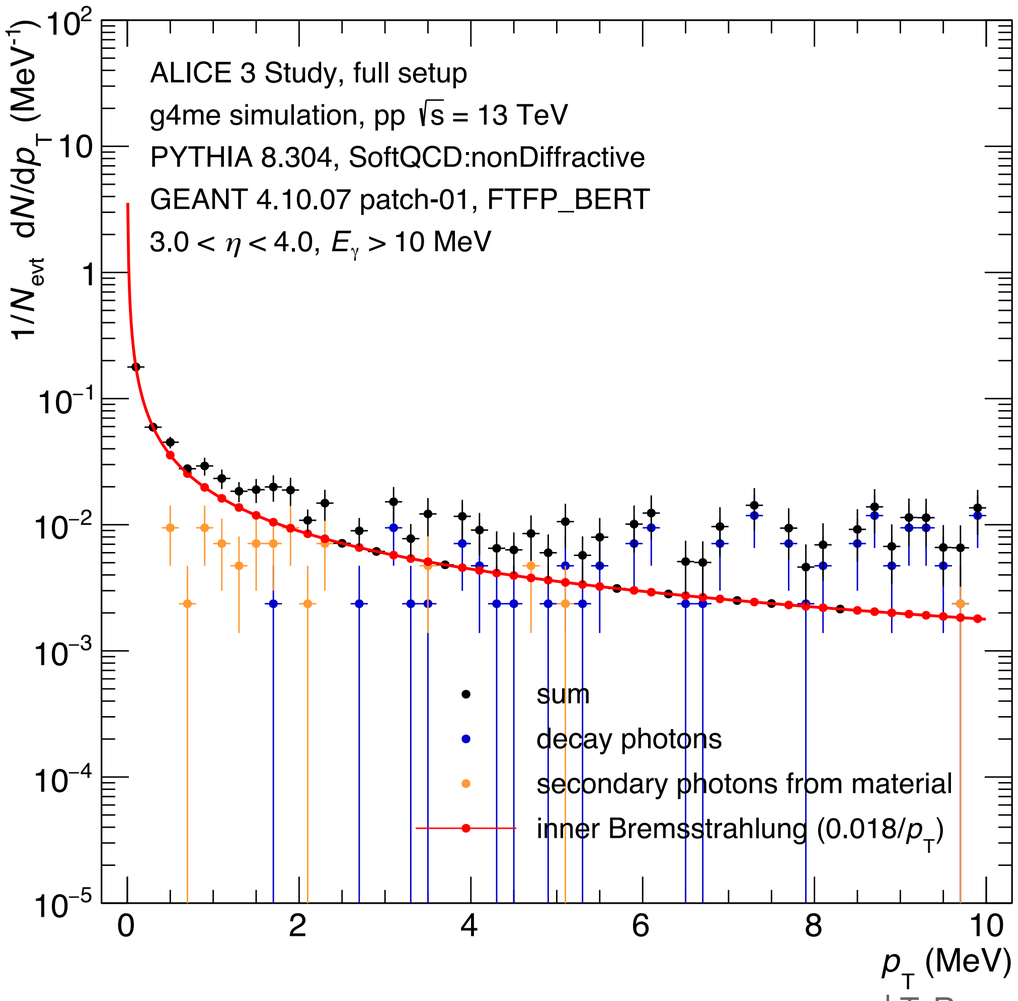


with electron veto



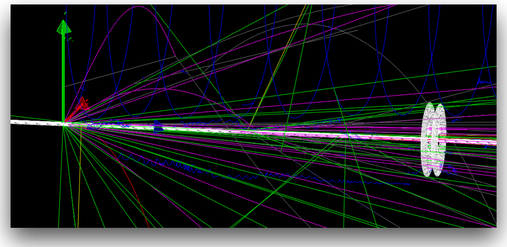


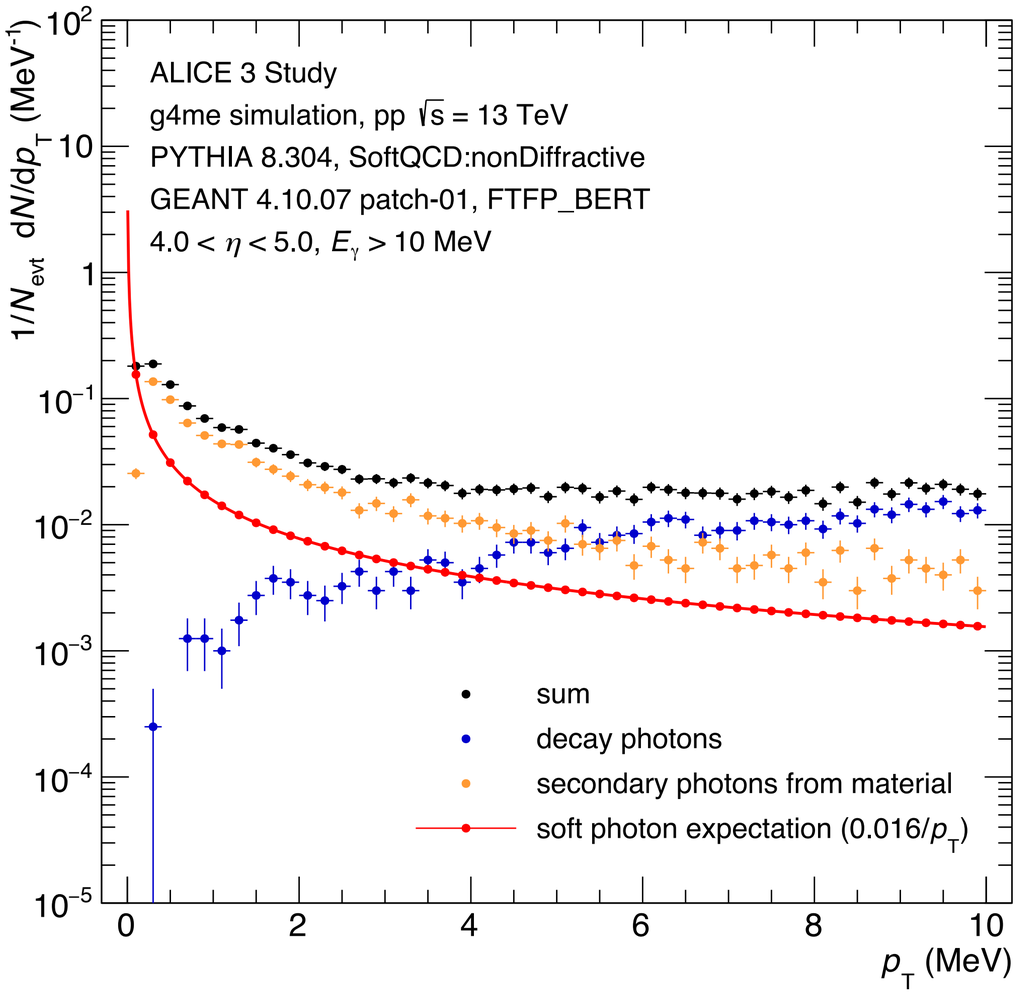
comparison of background for two scenarios:

$4 < \eta < 5$

yield

1. only beam pipe





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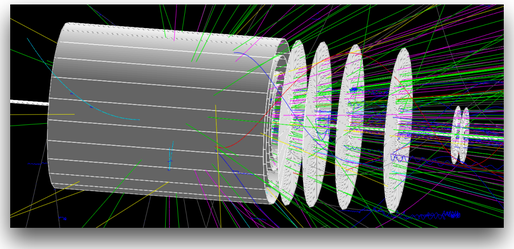

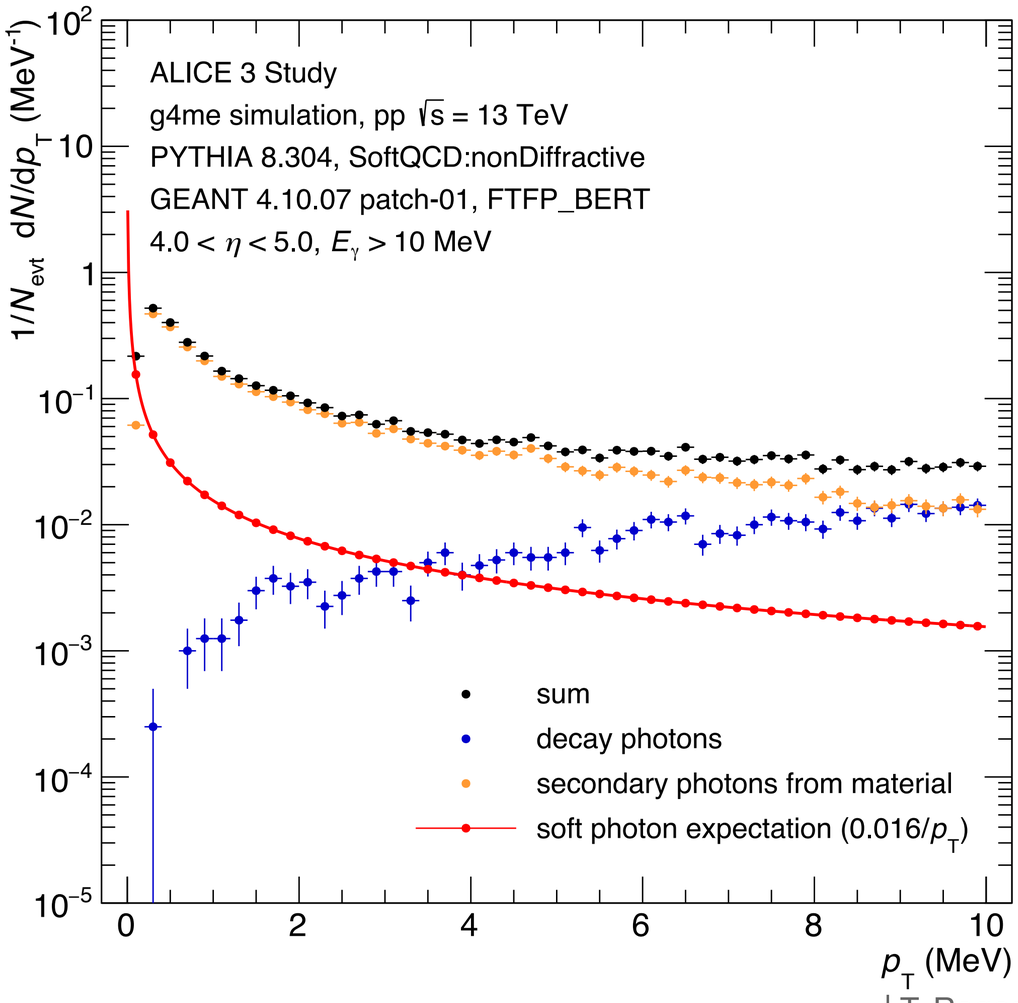

comparison of background for two scenarios:

4 < η < 5

yield

with electron veto

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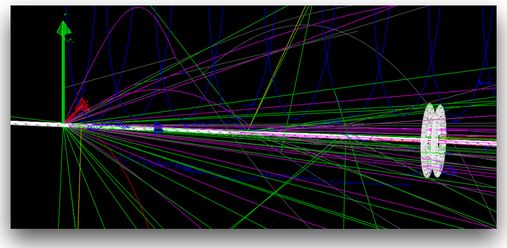

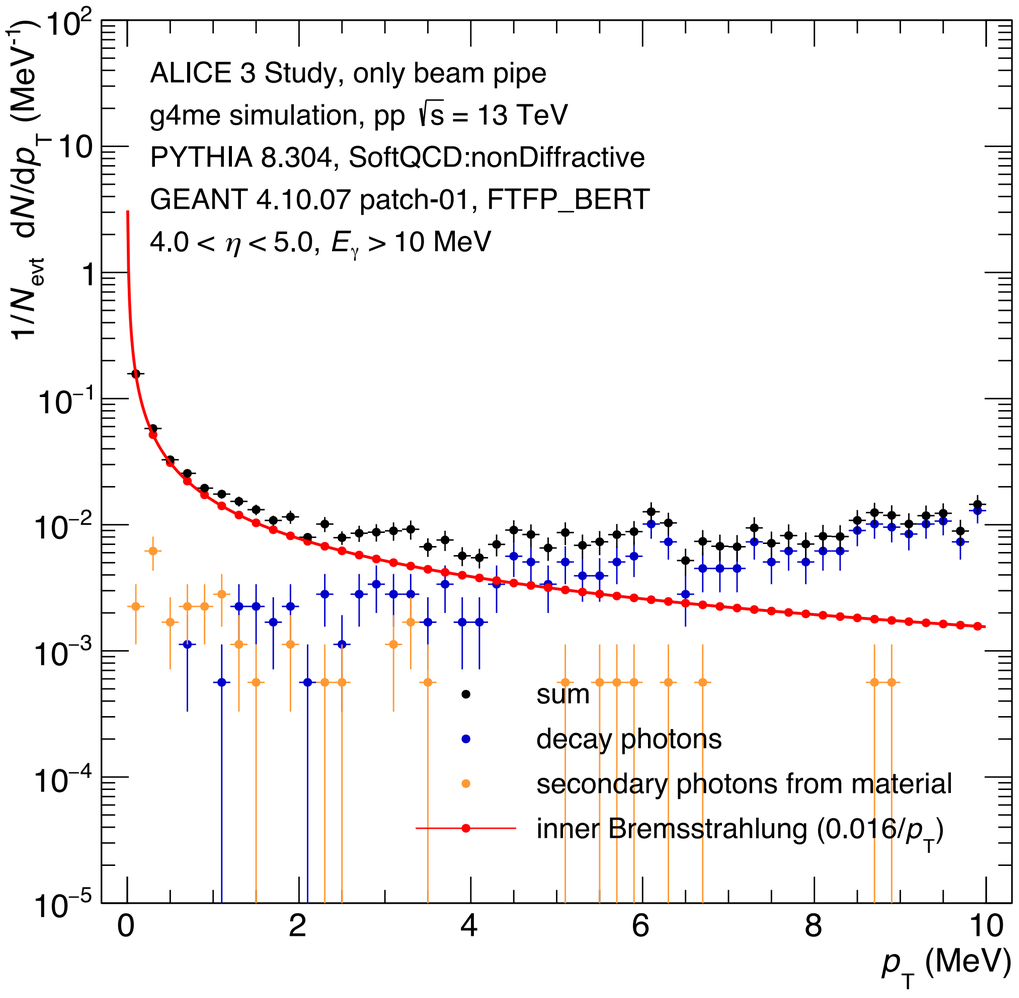
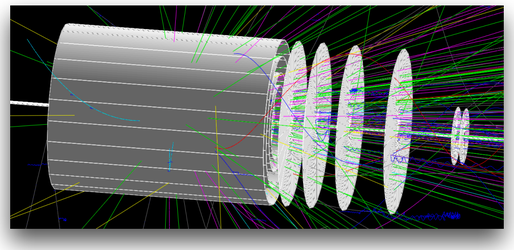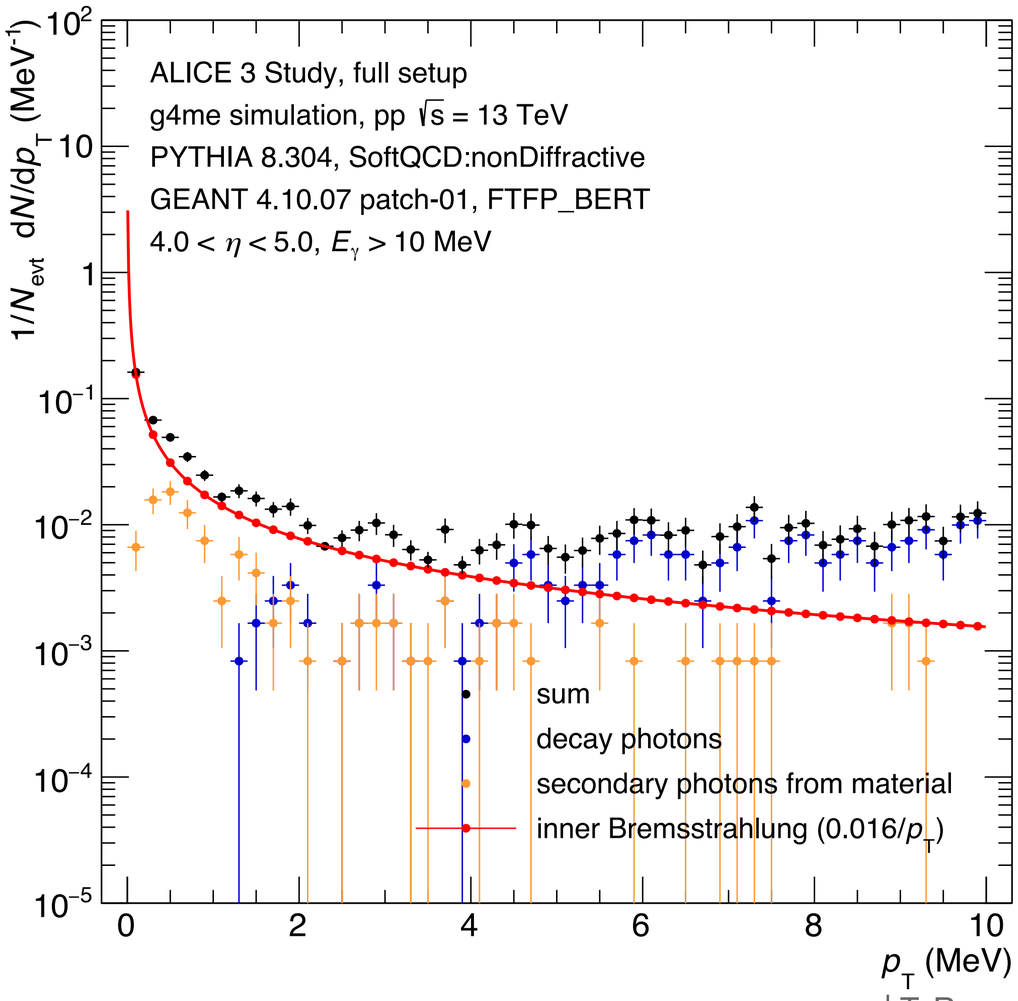
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