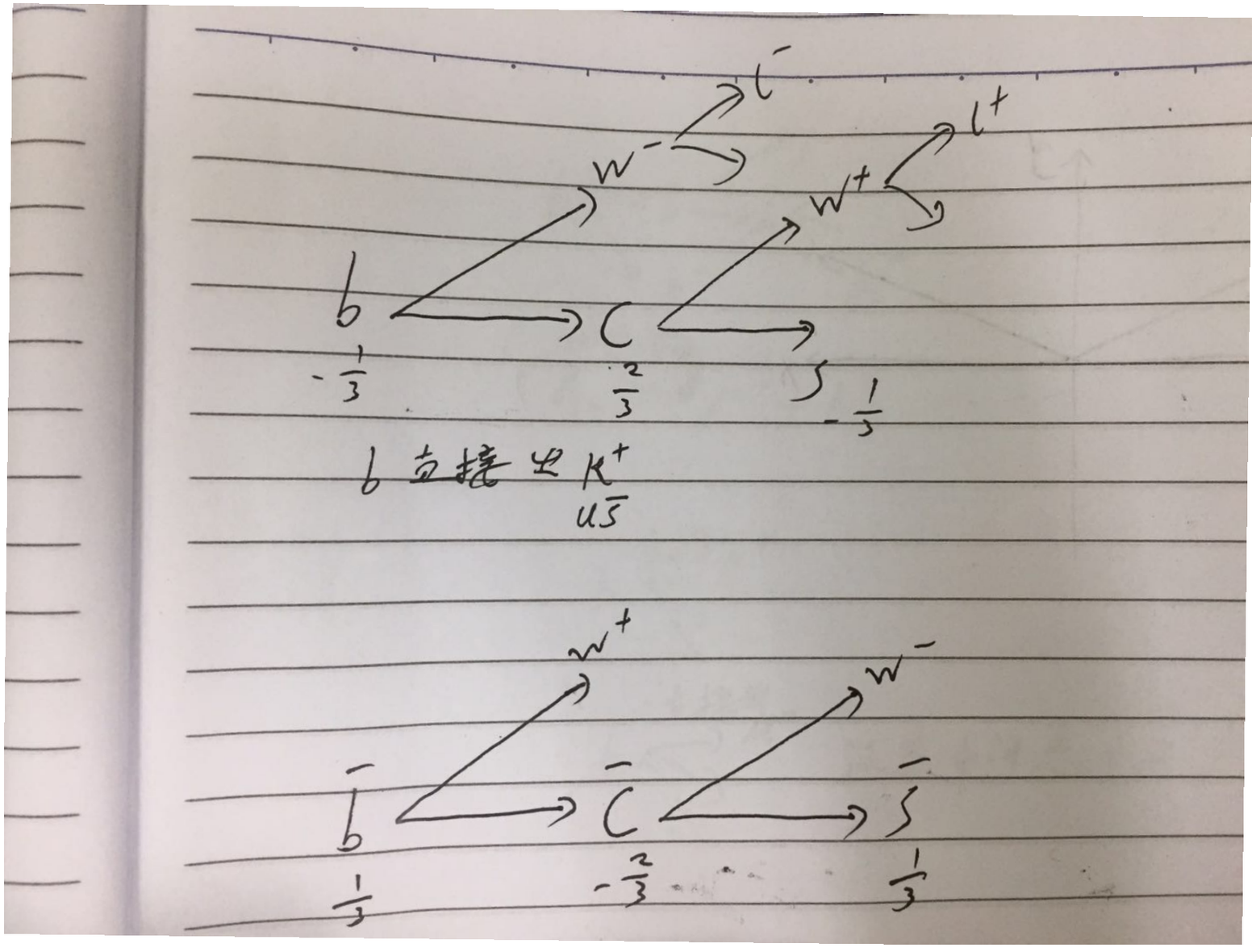
The analysis of Zpole -> b bbar try to separate b and bbar

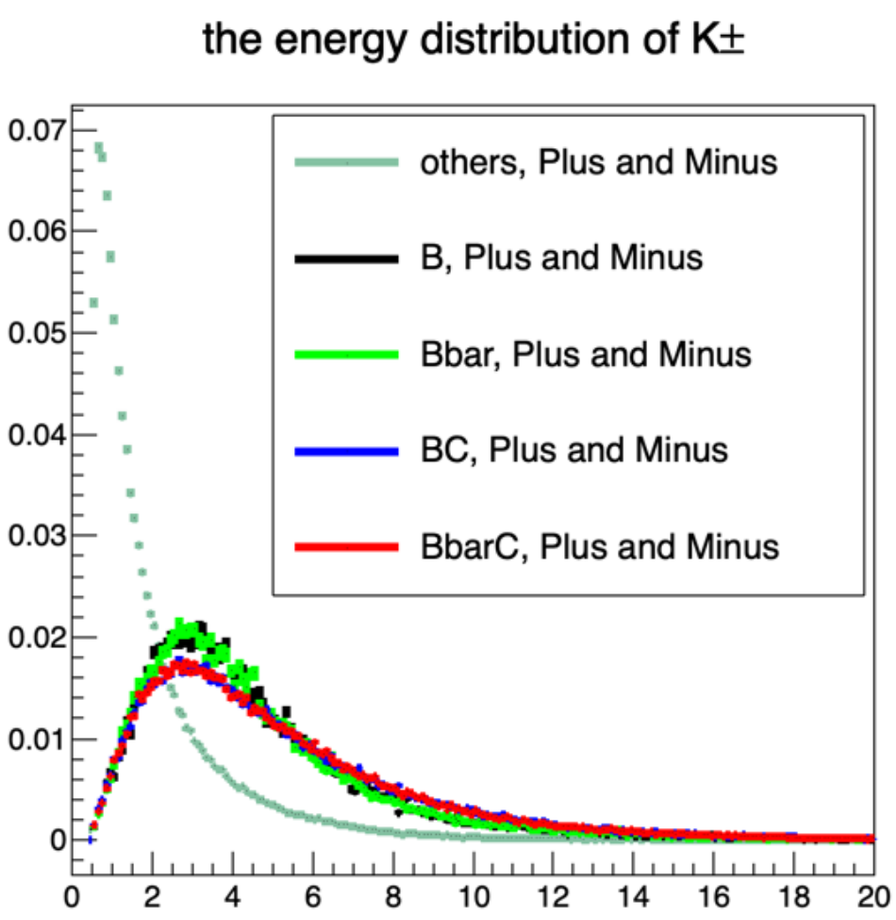
Yongfeng Zhu

Zpole → BBbar

B(Bbar) -> C(Cbar) -> S(Sbar)

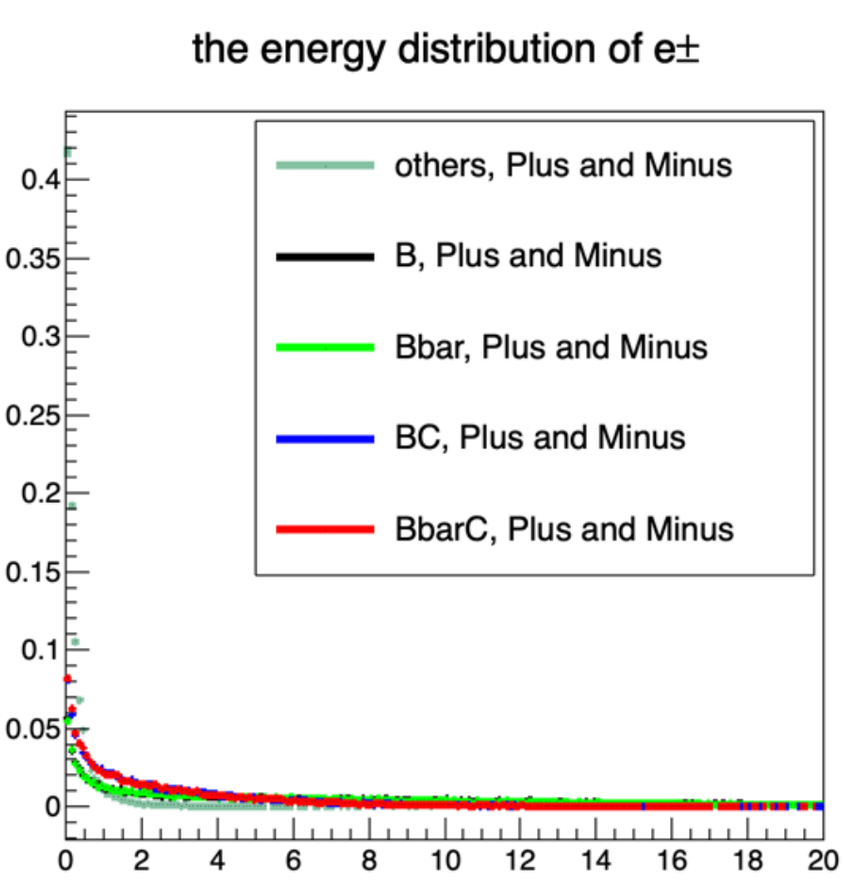
e+- u+- K+- e+- u+- K+-

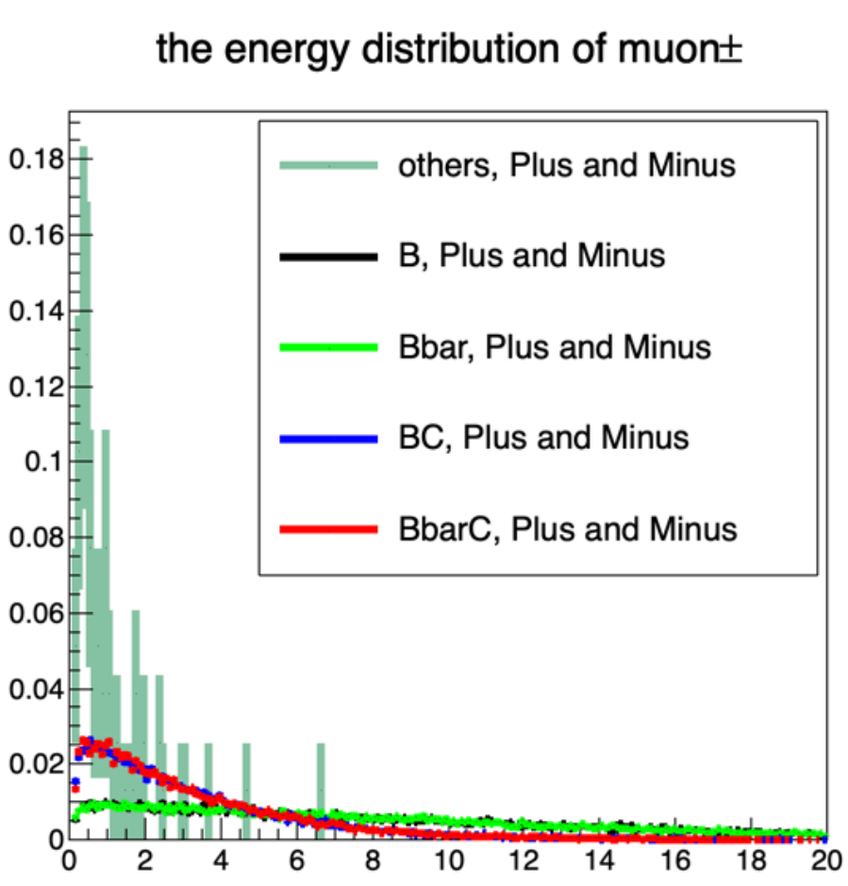




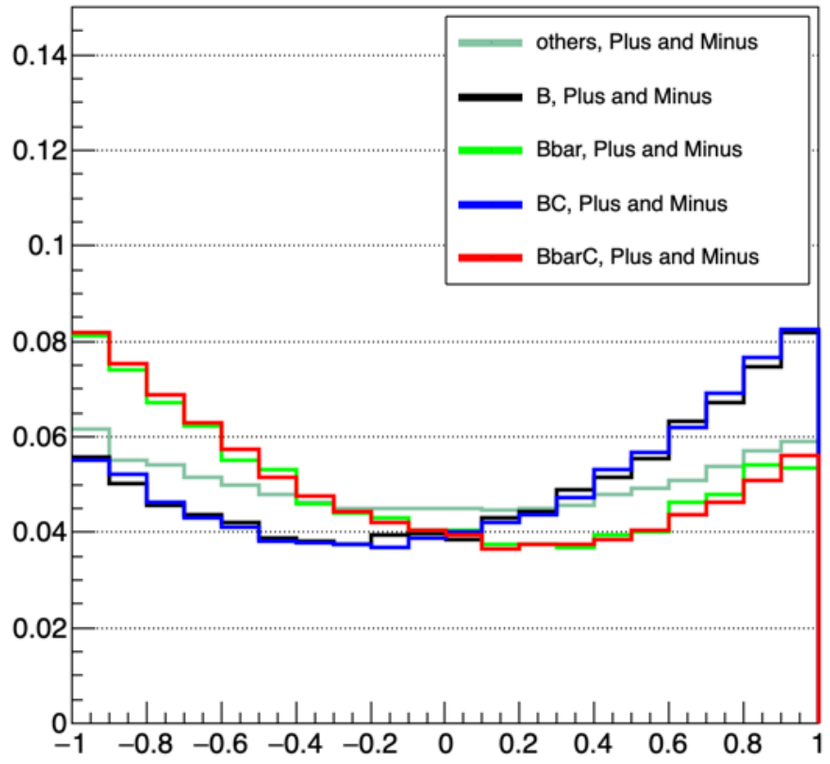
b以及b bar出来的正负粒子具有相同的能量分布

c以及c bar出来的正负粒子也具有相同的能量分布



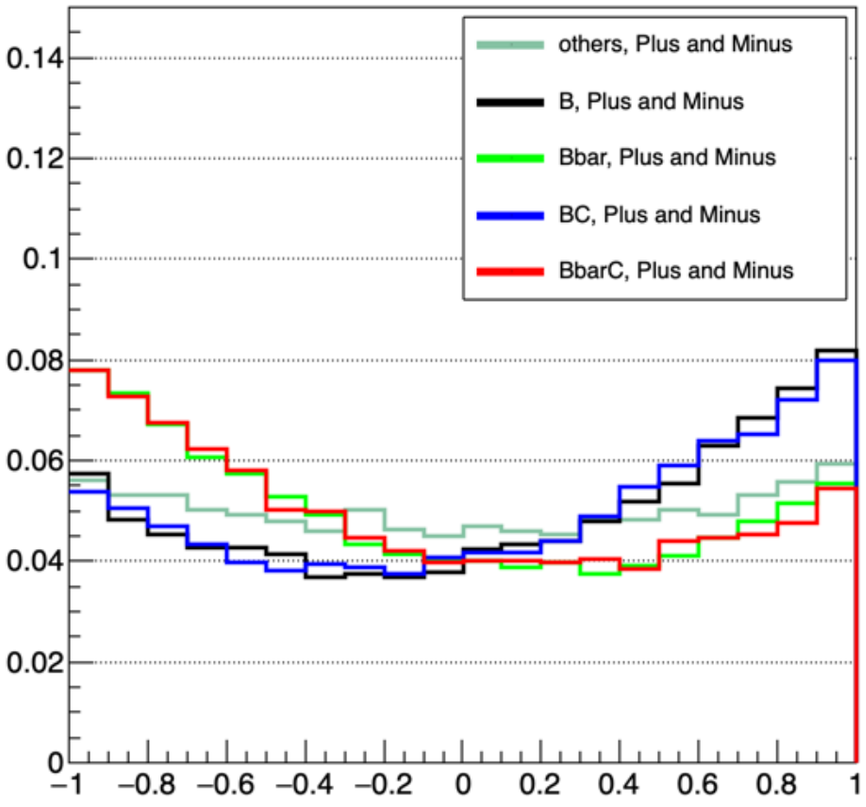


the costheta distribution of K±

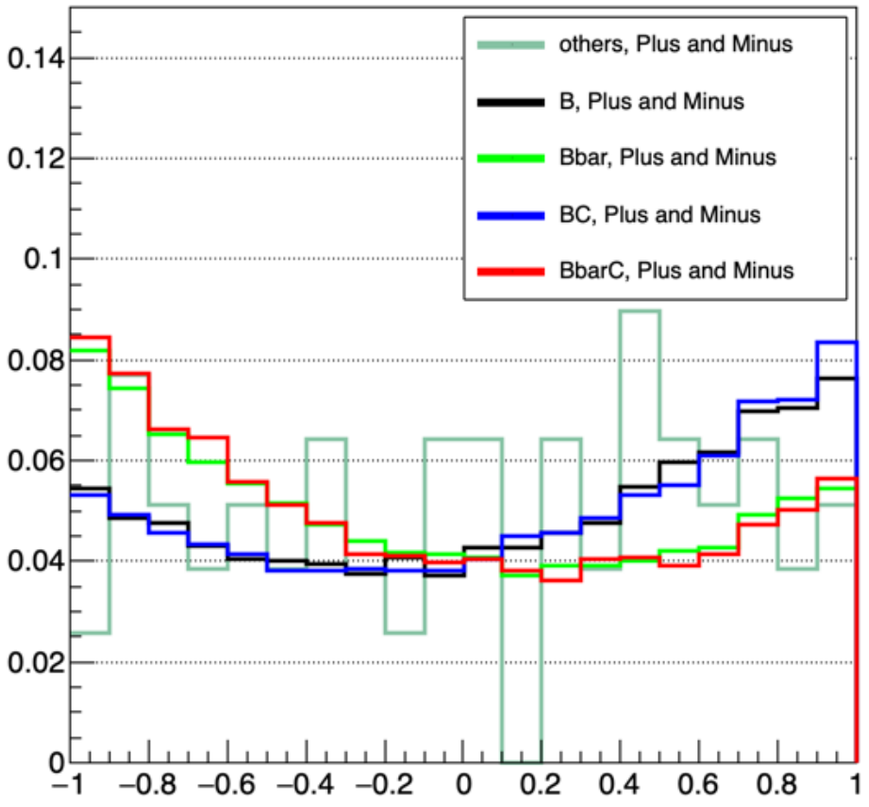


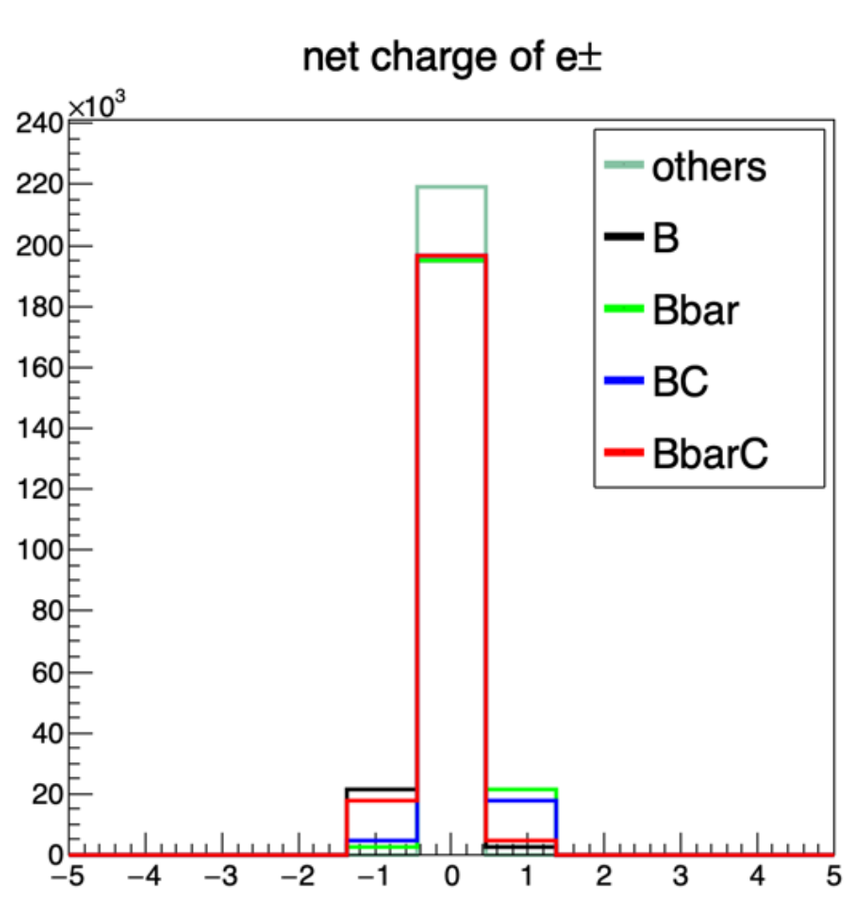
ar出来的粒子具有相反的
节，背对背的，需验证

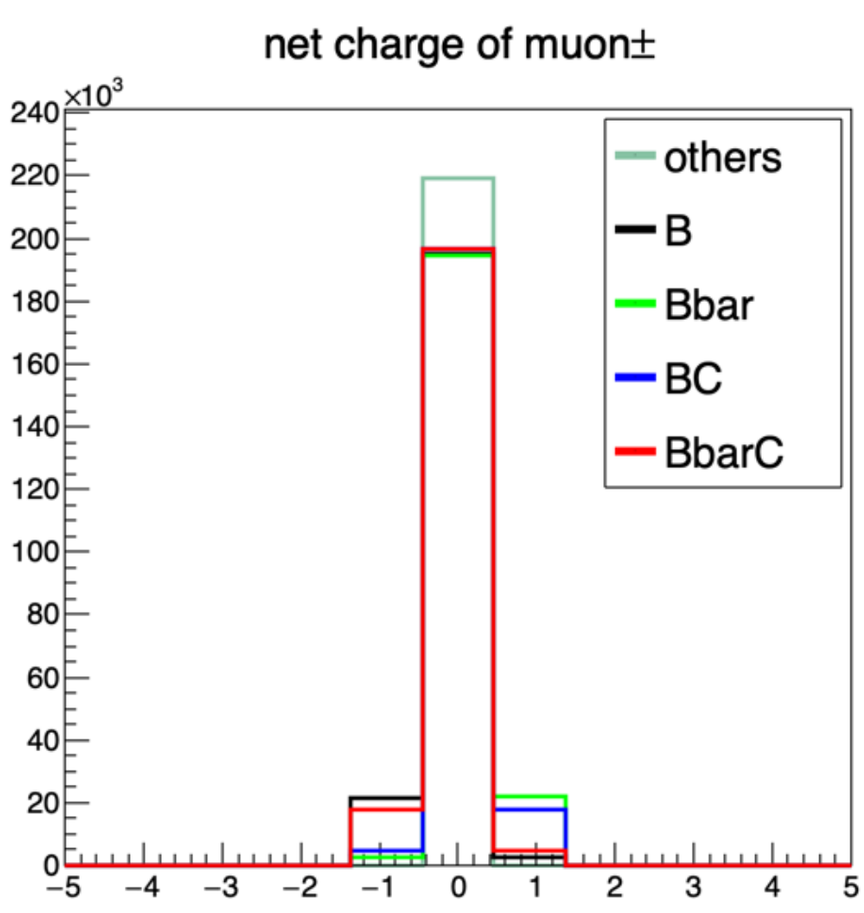
the costheta distribution of e±

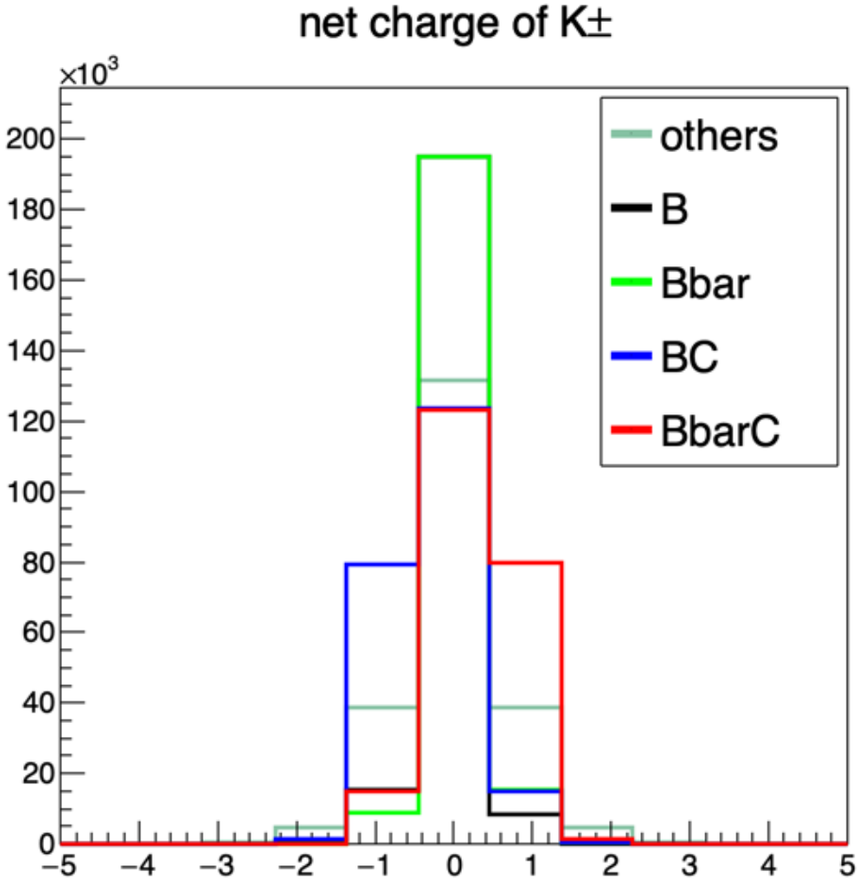


the costheta distribution of muon±

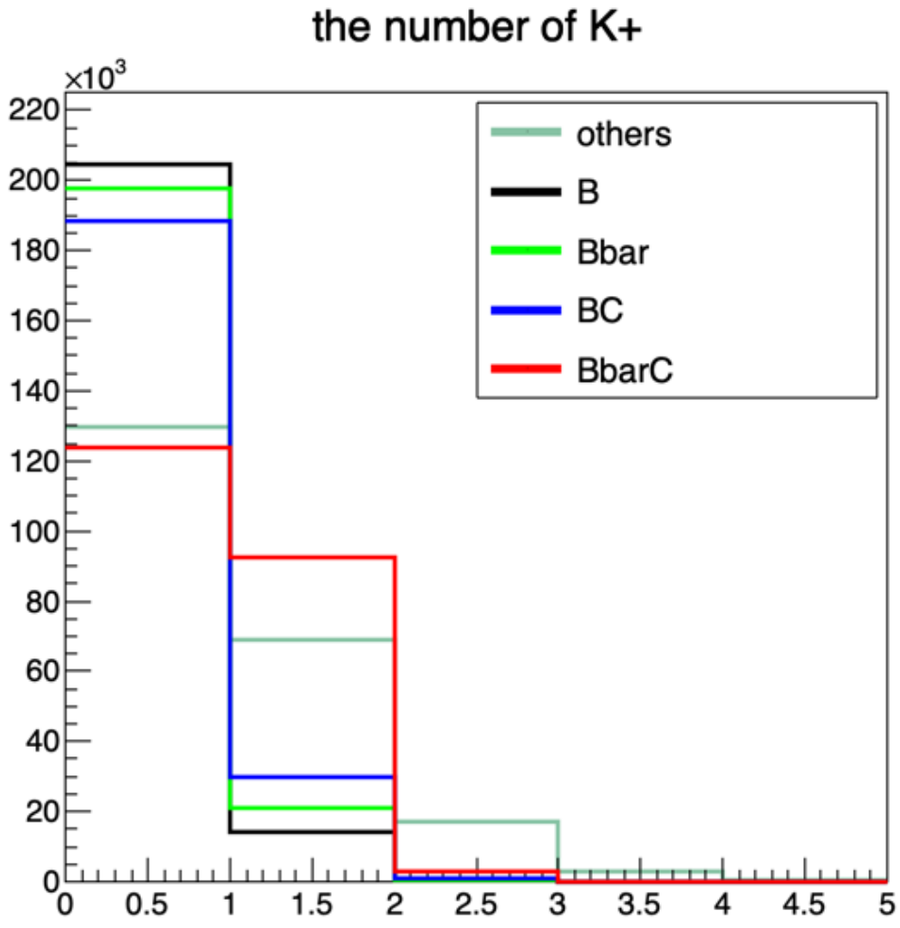


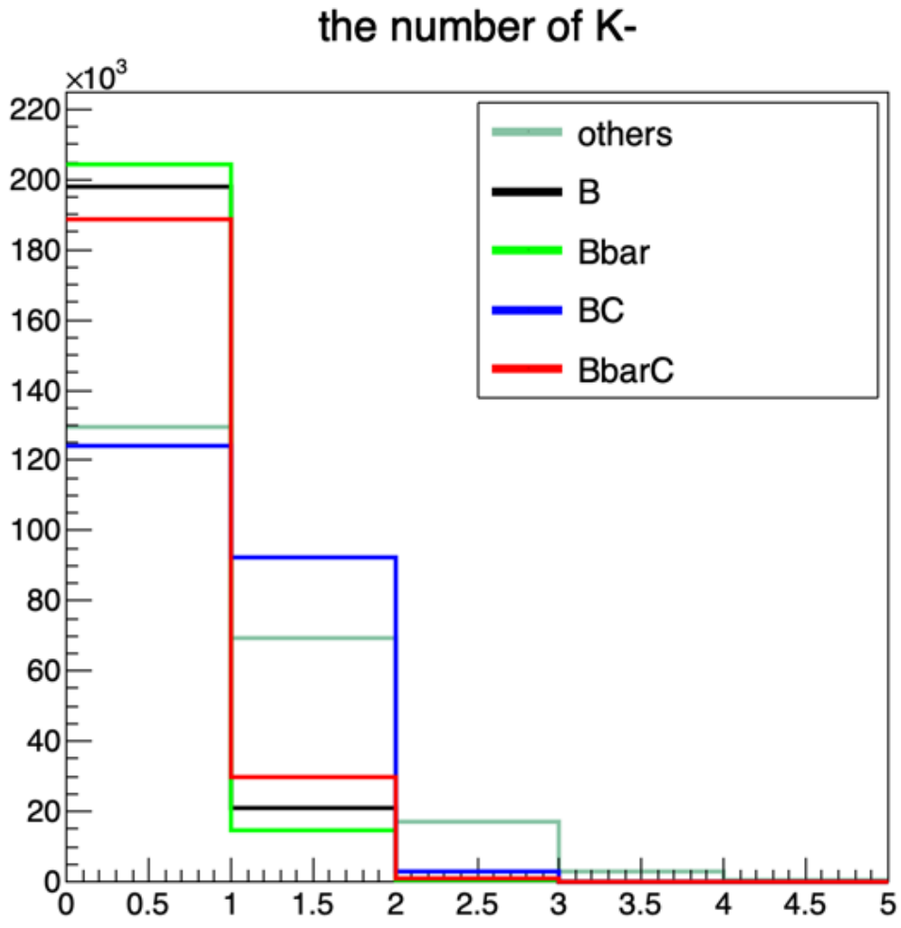






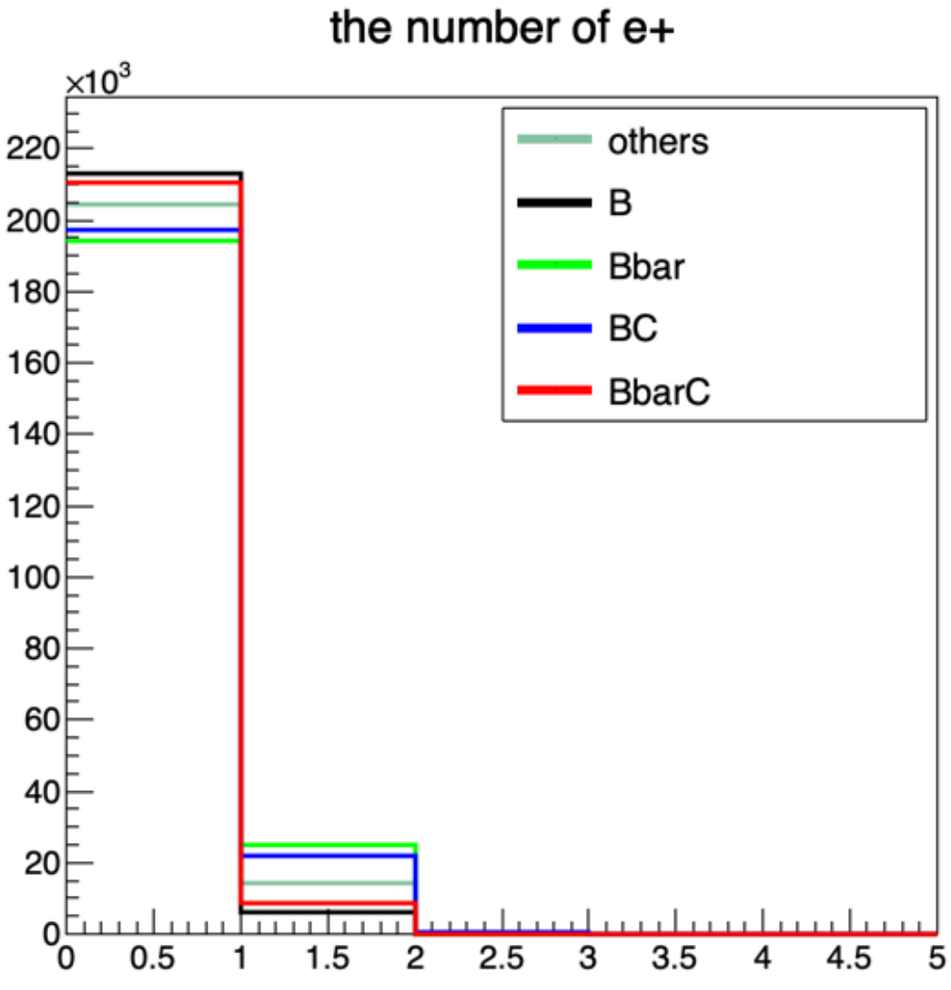
total	219308	other	B	Bbar	BC	BbarC
e	1	29	2572	21652	17832	4755
	-1	41	21757	2645	4781	17752
mu	1	2	2601	21907	17738	4856
	-1	1	21670	2664	4876	17929
k	1	38568	4131	15672	25631	79843
	-1	38736	15873	4249	25697	14920

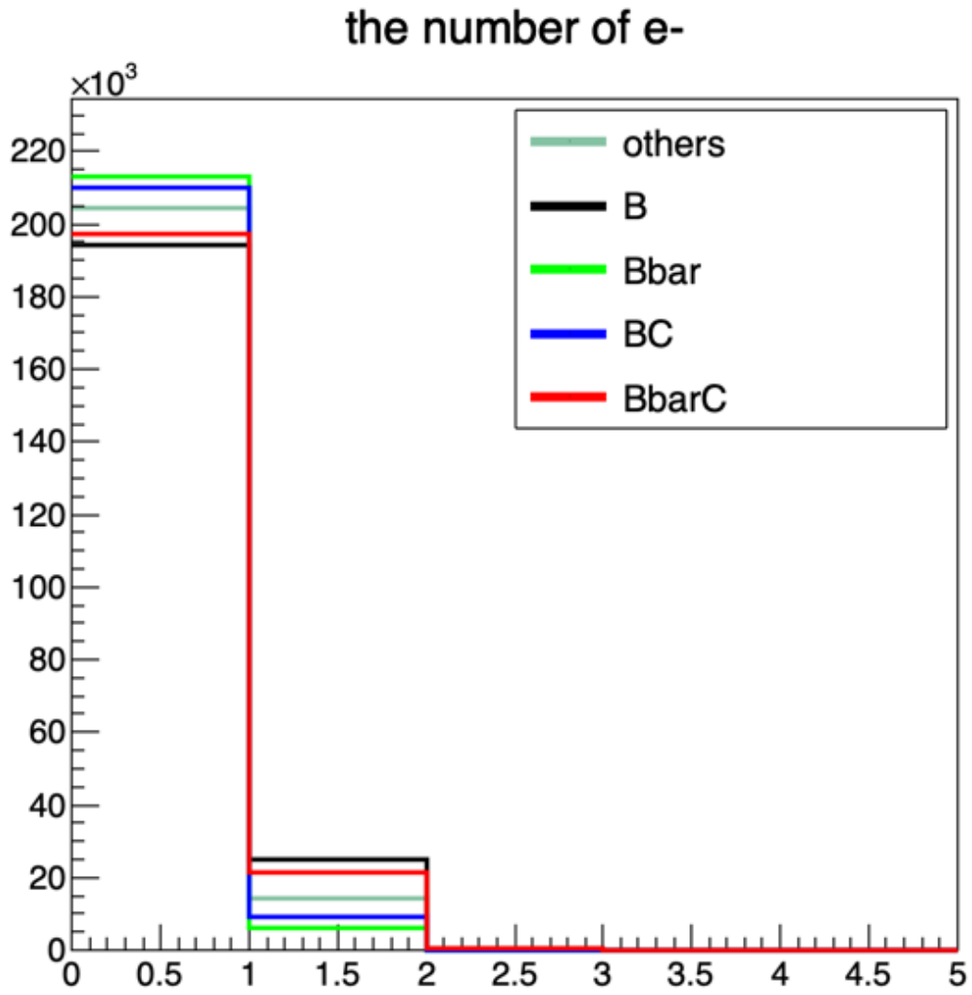




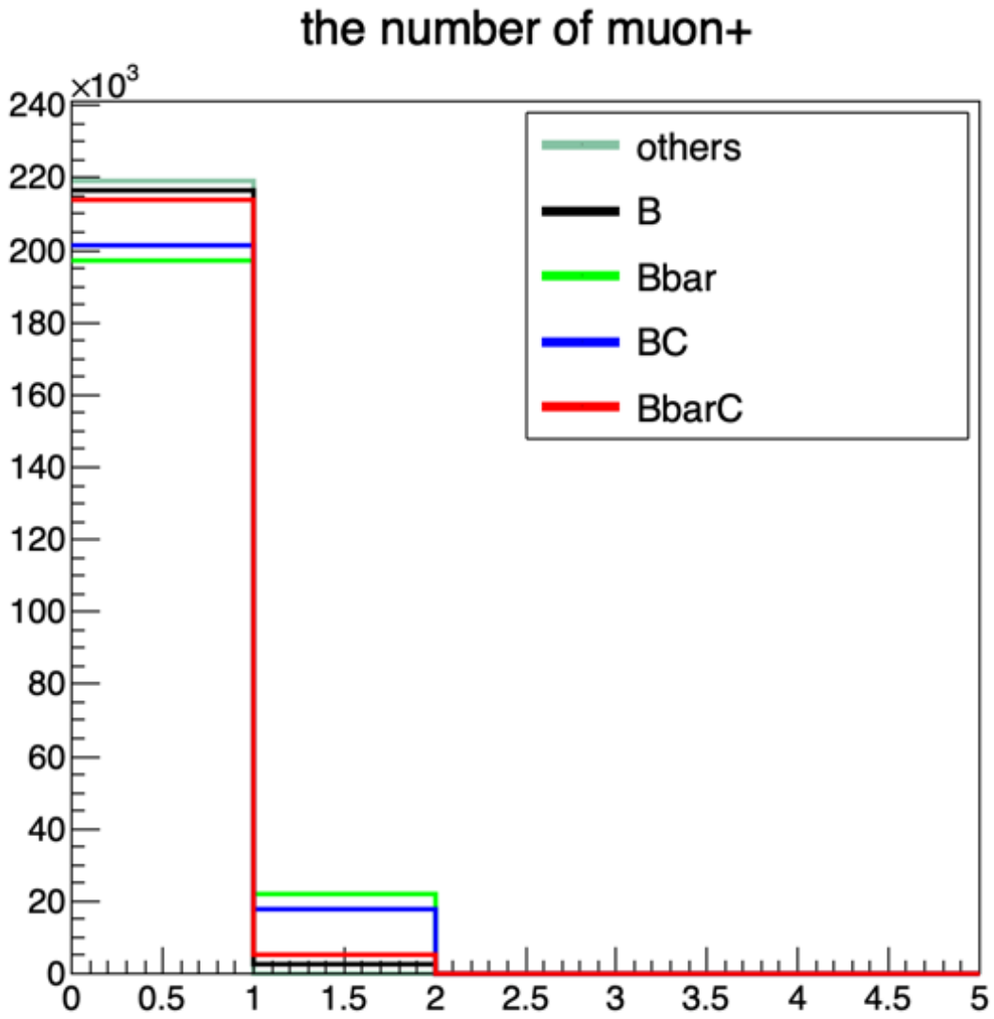
b出K-的几率大一些，因为介子的电荷符号与其所含夸克的电荷一致。所以只要探测到了K+并且确定它是从初级顶点出来的，就有 %的把握确定它是从B bar来的。

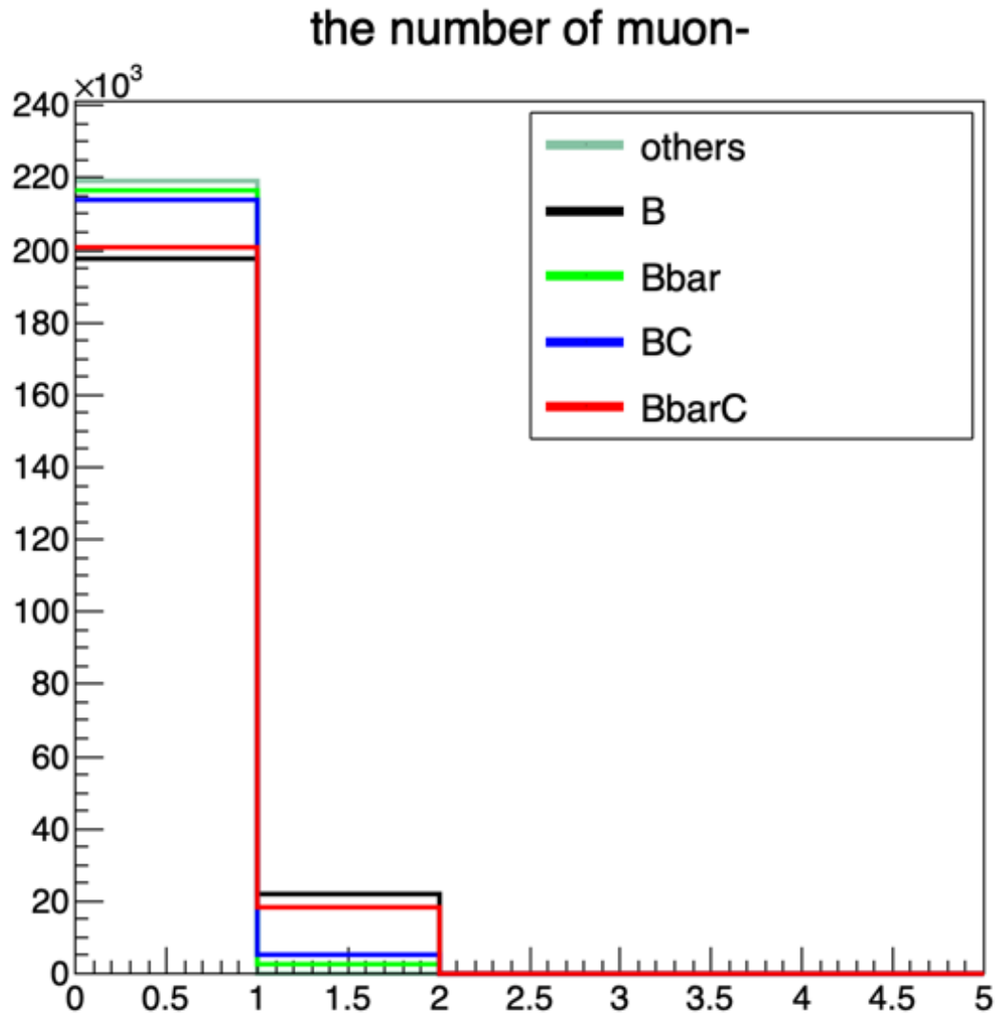
	219308	other	B	Bbar	BC	BbarC
K+	ratio	0.3156702	0.0653008	0.0950489	0.1352755	0.4215076
	1	69229	14321	20845	29667	92440
	2	17127	336	641	985	3001
	ratio	0.0780956	0.00071	0.00292	0.00449	0.01368
K-	ratio	0.3163222	0.0954593	0.066395	0.420212	0.13594123
	1	69372	20935	14561	92156	29813
	2	17063	610	358	3054	934
	ratio	0.07780	0.00278	0.00081	0.0139256	0.00426





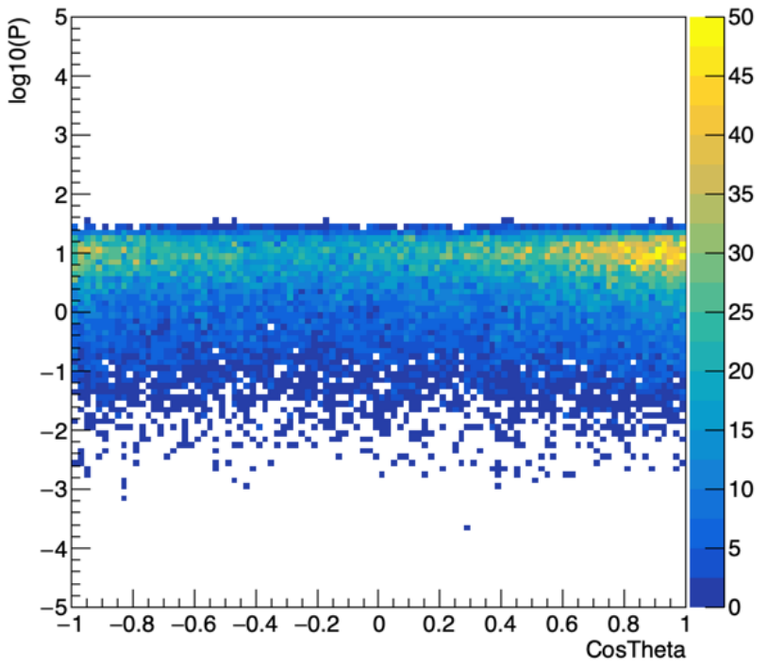
		other	B	Bbar	BC	BbarC
e+	ratio	0.0643843	0.0263556	0.113082	0.0993123	0.0402675
	1	14120	5780	24800	21780	8831
e-	ratio	0.0644481	0.1138353	0.0264422	0.0410746	0.0984141
	1	14134	24965	5799	9008	21583



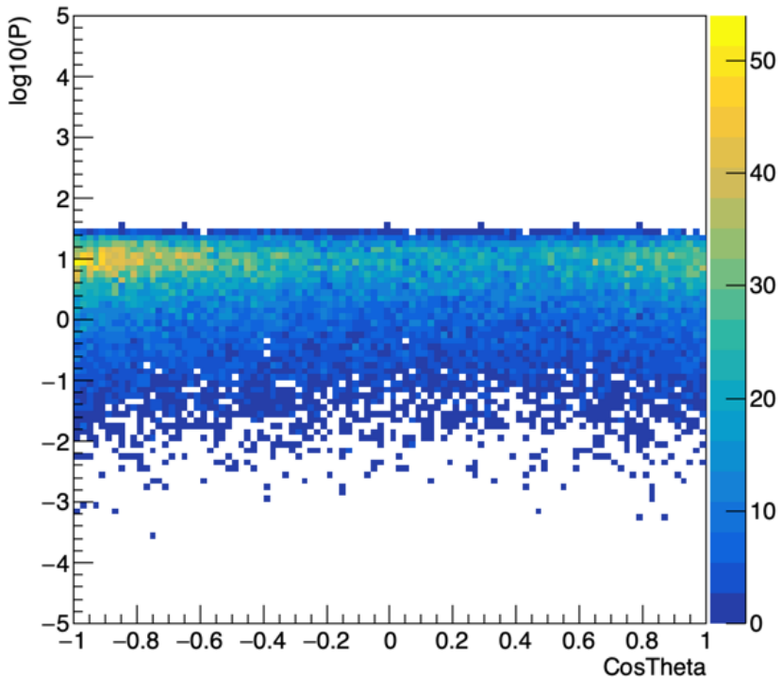


		other	B	Bbar	BC	BbarC
mu+	ratio	0.0001823	0.0126625	0.1007168	0.0822678	0.023574151
	1	40	2777	22088	18042	5170
mu-	ratio	0.0001823	0.0996133	0.0129726	0.0236288	0.0831752
	1	39	21846	2845	5182	18241

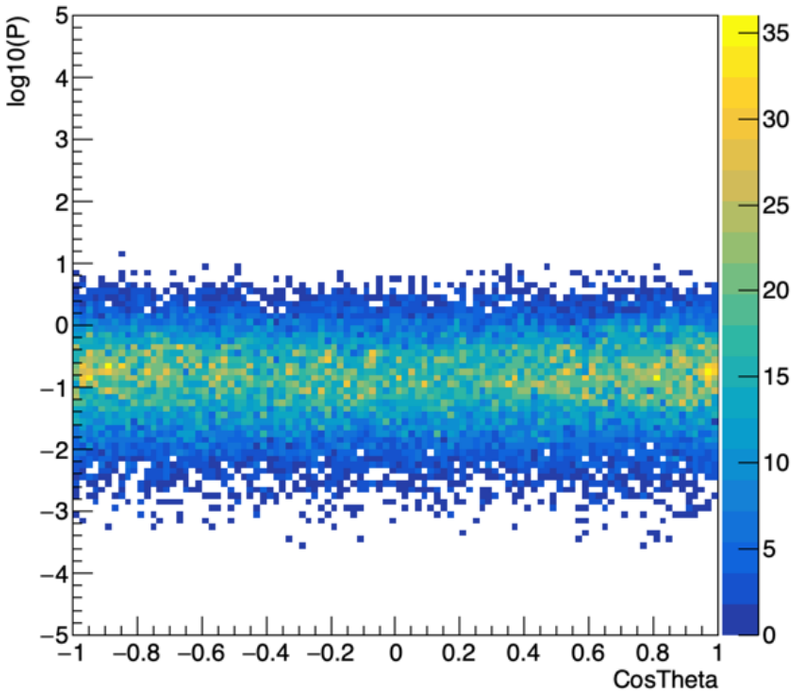
Bottom e±



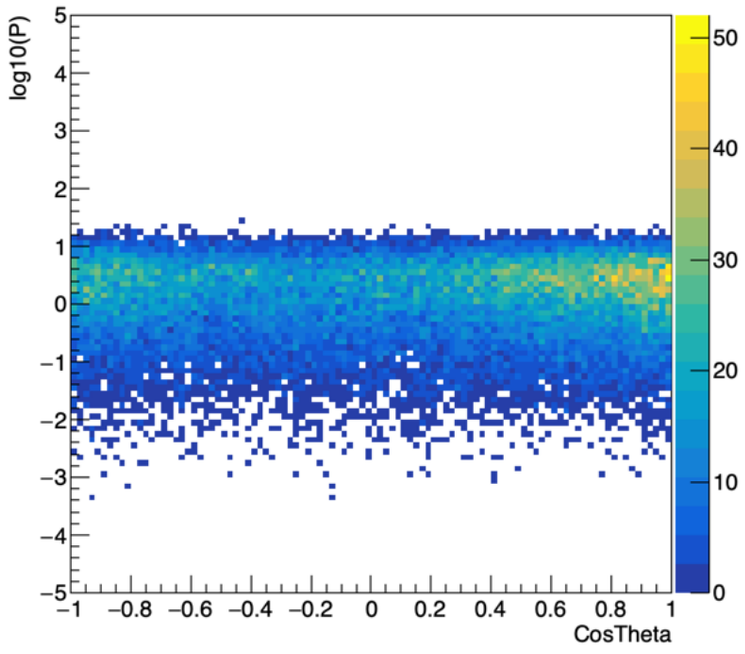
$\overline{\text{Bottom}}$ e±



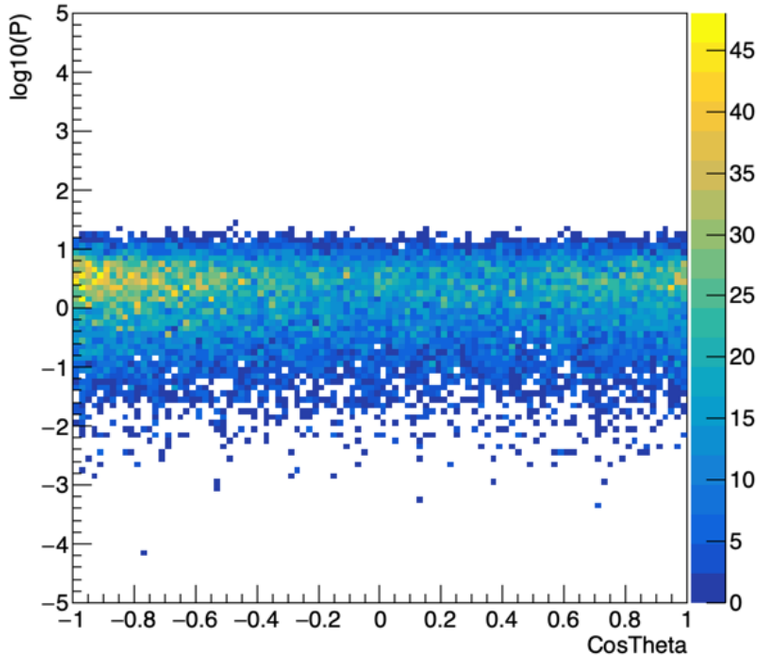
others, e±



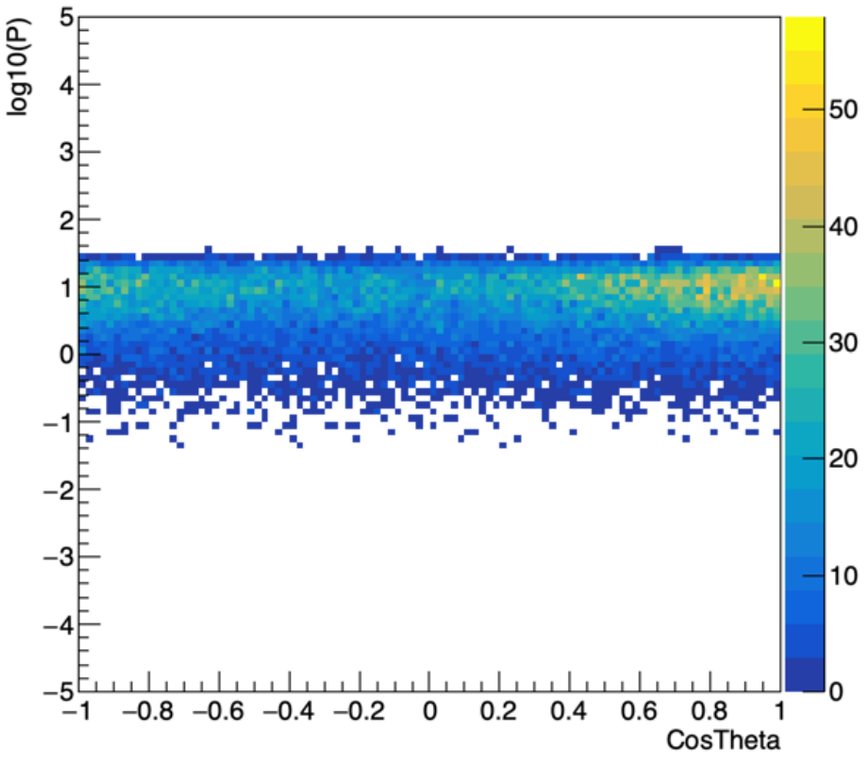
Bottom-charm e±



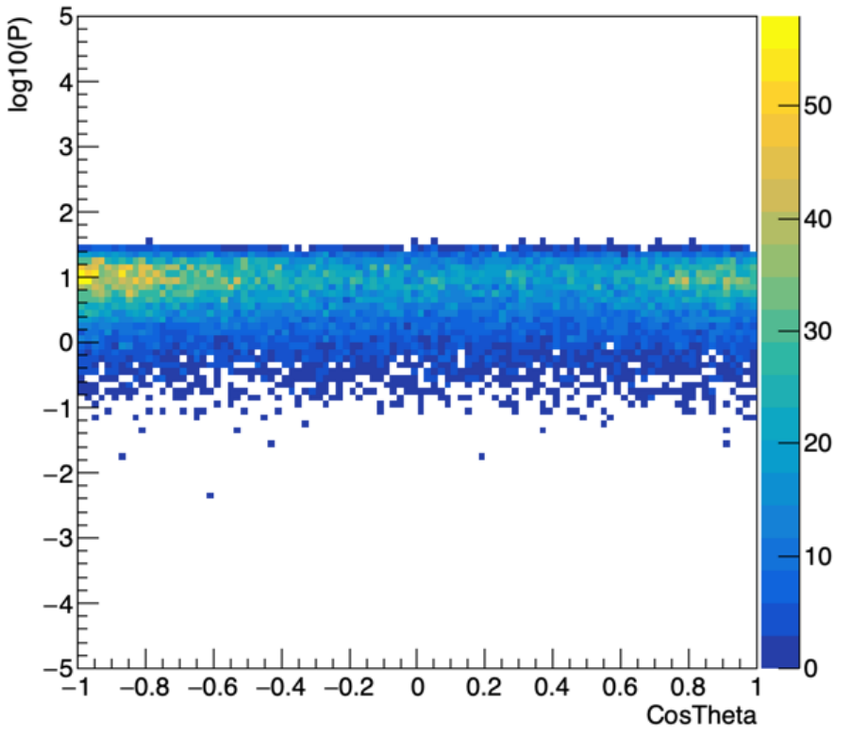
$\overline{\text{Bottom}}$-charm e±



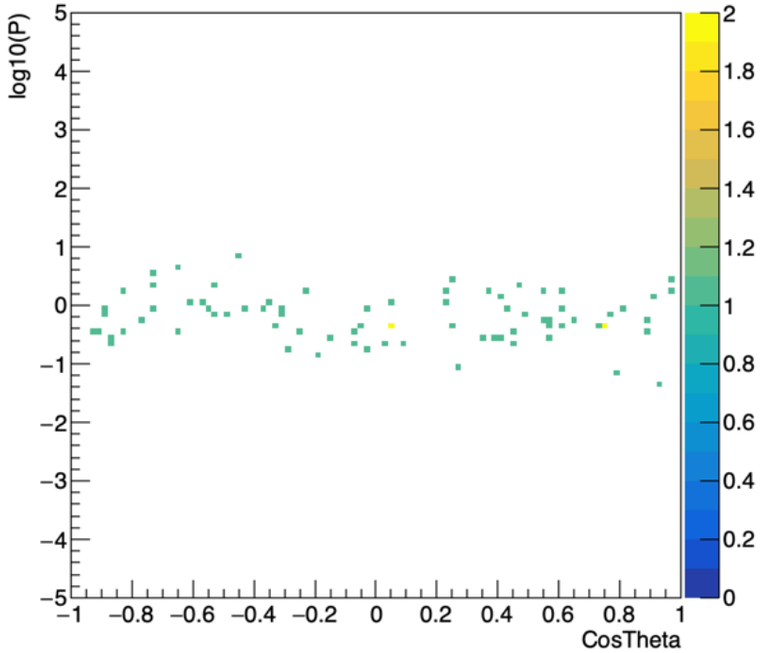
Bottom muon±



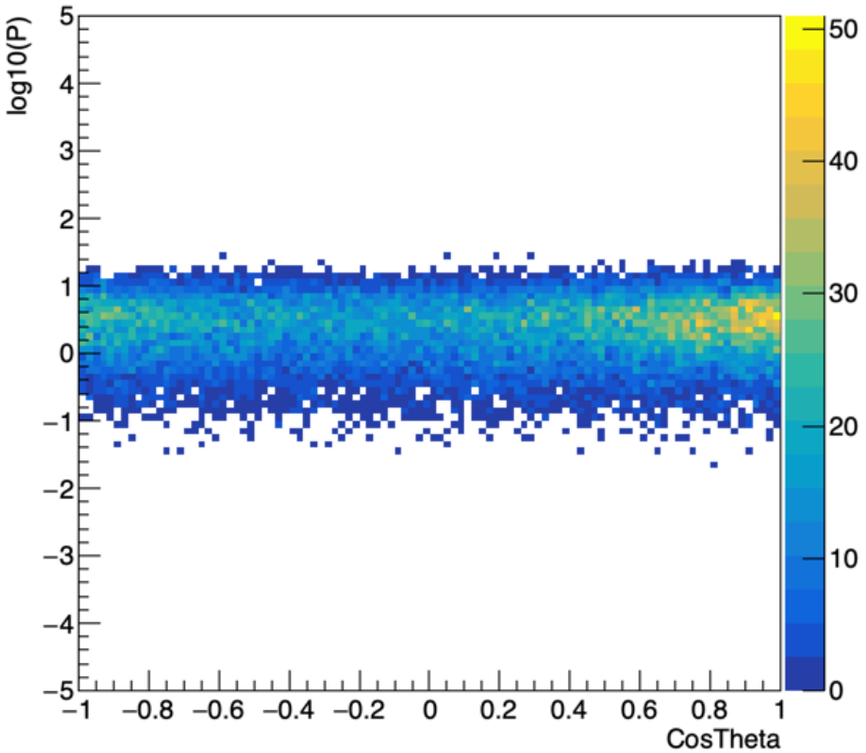
$\overline{\text{Bottom}}$ muon±



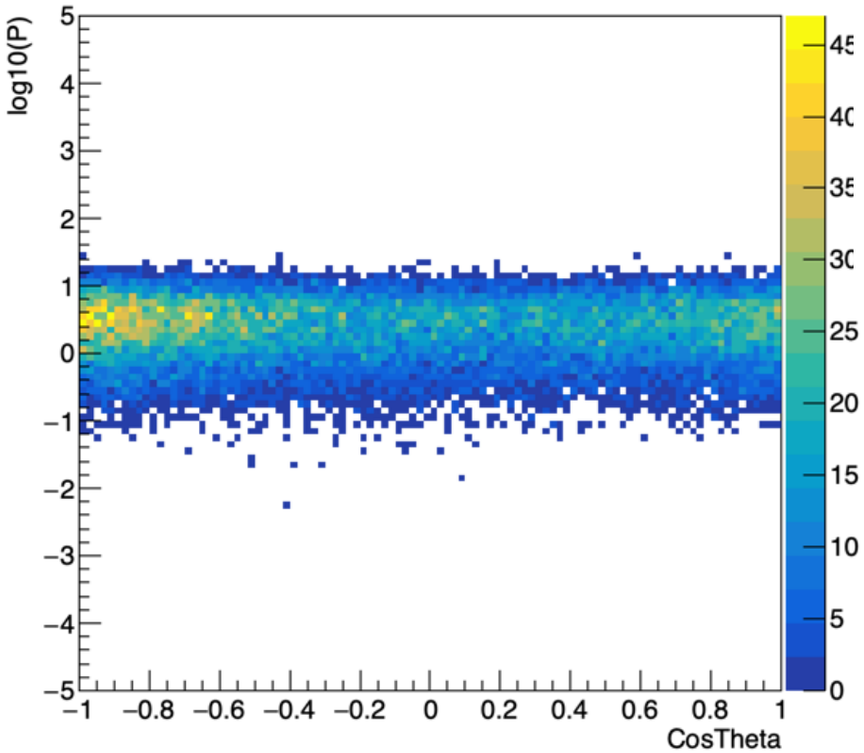
others, muon±



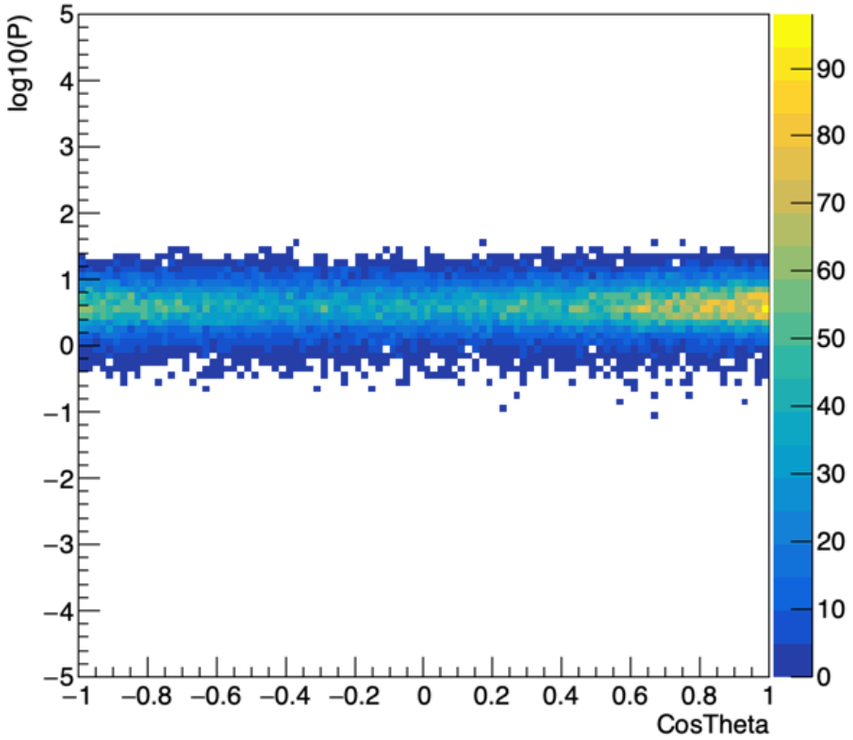
Bottom-charm muon±



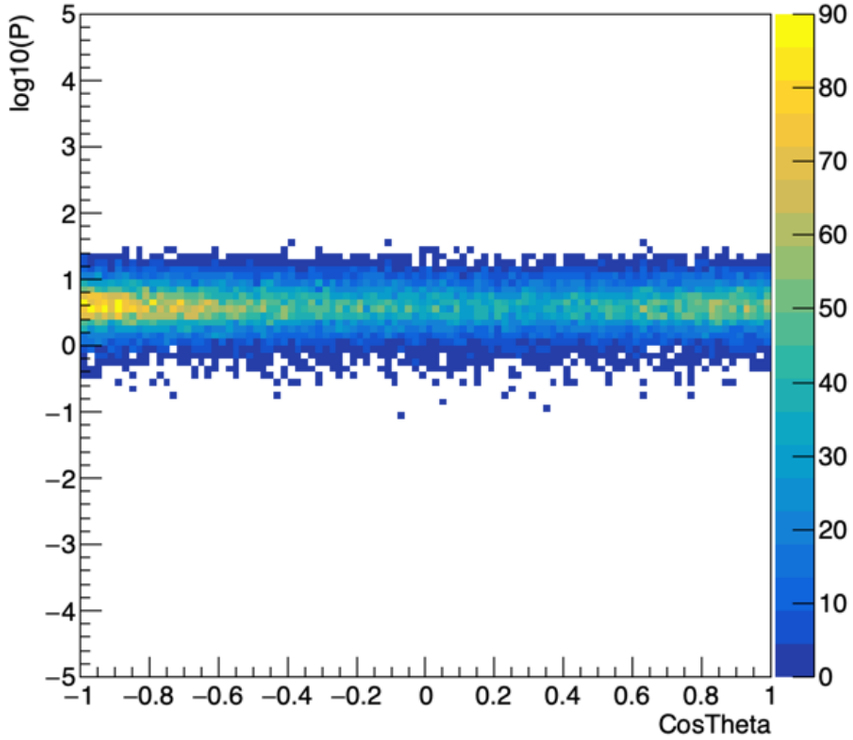
$\overline{\text{Bottom}}$-charm muon±



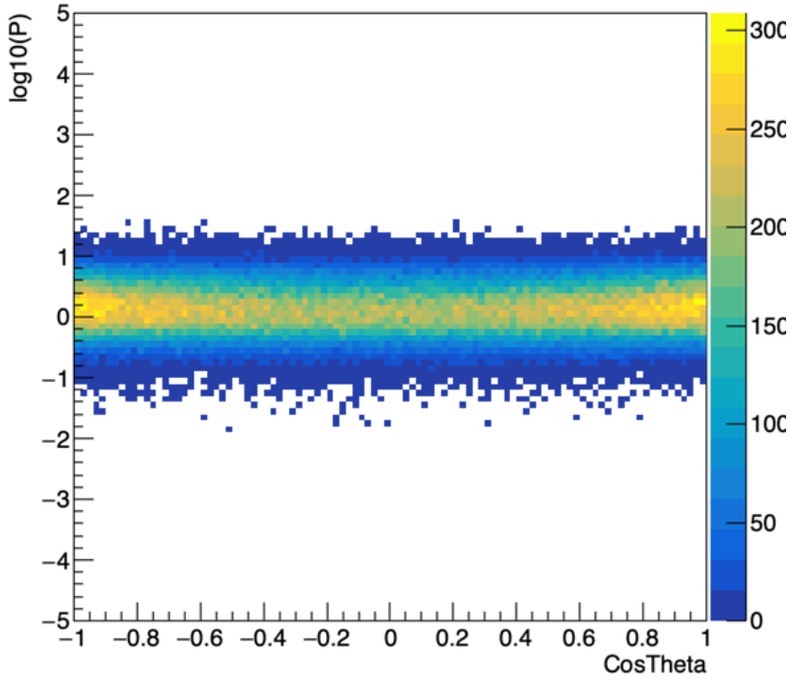
Bottom K±



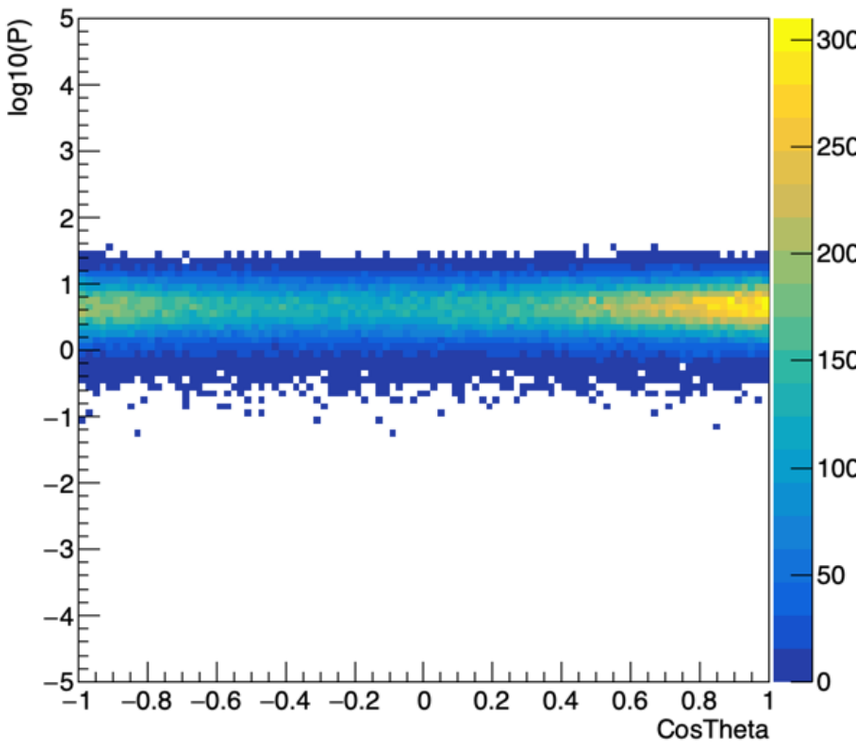
$\overline{\text{Bottom}}$ K±



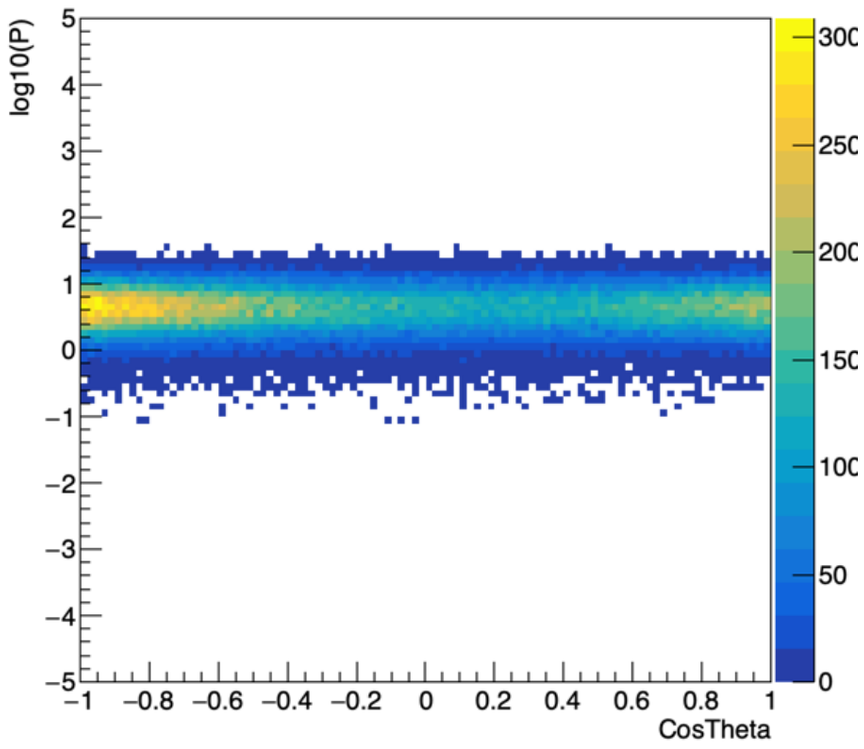
others, K±



Bottom-Charm K±



$\overline{\text{Bottom}}$-Charm K±



- Most data from Z pole factory are well described by two jets of hadrons. Most of beauty and charm hadrons come from energetic jets, and beauty & anti-beauty hadrons mostly appear on opposite sites and somewhat also for charm hadrons.
- The branching ratio of Z to b bbar is about 15%.
- Since the b quark is the lighter element of the third-generation quark doublet, the decays of b-flavored hadrons ovvur via generation-changing processes.
- The dominant decay mode of a b quark is b -> cW*-, where the virtual W materializes either into a pair of leptons, or into a pair of quarks which then hadronizes.
- The transition b->u is suppressed by 0.01 relative to b->c transitions. The decays in which the spectator quark combines with one of the quarks from W* to form one of the final state hadrons are suppressed by a factor 1/9, because the colors of the two quarks from different sources must match.
- The transitions b->s and b->d are flavor-changing neutral-current processes.
- They are not allowed in the SM, they can occur via more complicated loop diagrams.

b-hadron species	Fraction in decays of $Z^0 \to b\bar{b}$
B^0	0.404 ± 0.009
B^+	0.404 ± 0.009
B_s	0.103 ± 0.009
b baryons	0.089 ± 0.015

Particle	Lifetime [ps]
B^+	1.638 ± 0.004
B^0	1.520 ± 0.004
B_s^0	1.505 ± 0.005
B_{sL}^0	1.413 ± 0.006
B_{sH}^0	1.609 ± 0.010
B_c^+	0.507 ± 0.009
Λ_b^0	1.470 ± 0.010
Ξ_b^-	1.571 ± 0.040
Ξ_b^0	1.479 ± 0.031
Ω_b^-	$1.64^{+0.18}_{-0.17}$