CEEX σ and $A_{\rm FB}$, energy cut-off study

$e^-e^+ \to \mu^-\mu^+$, at 189GeV. Energy cut: $v < v_{\rm max}$, $v = 1 - M^2_{f\bar{f}}/s$.

Scattering angle for $A_{\rm FB}$ is $\theta = \theta^\bullet$. No cut in $\theta^\bullet$. E-W corr. in $\mathcal{KK}$ according to DIZET 6.x.

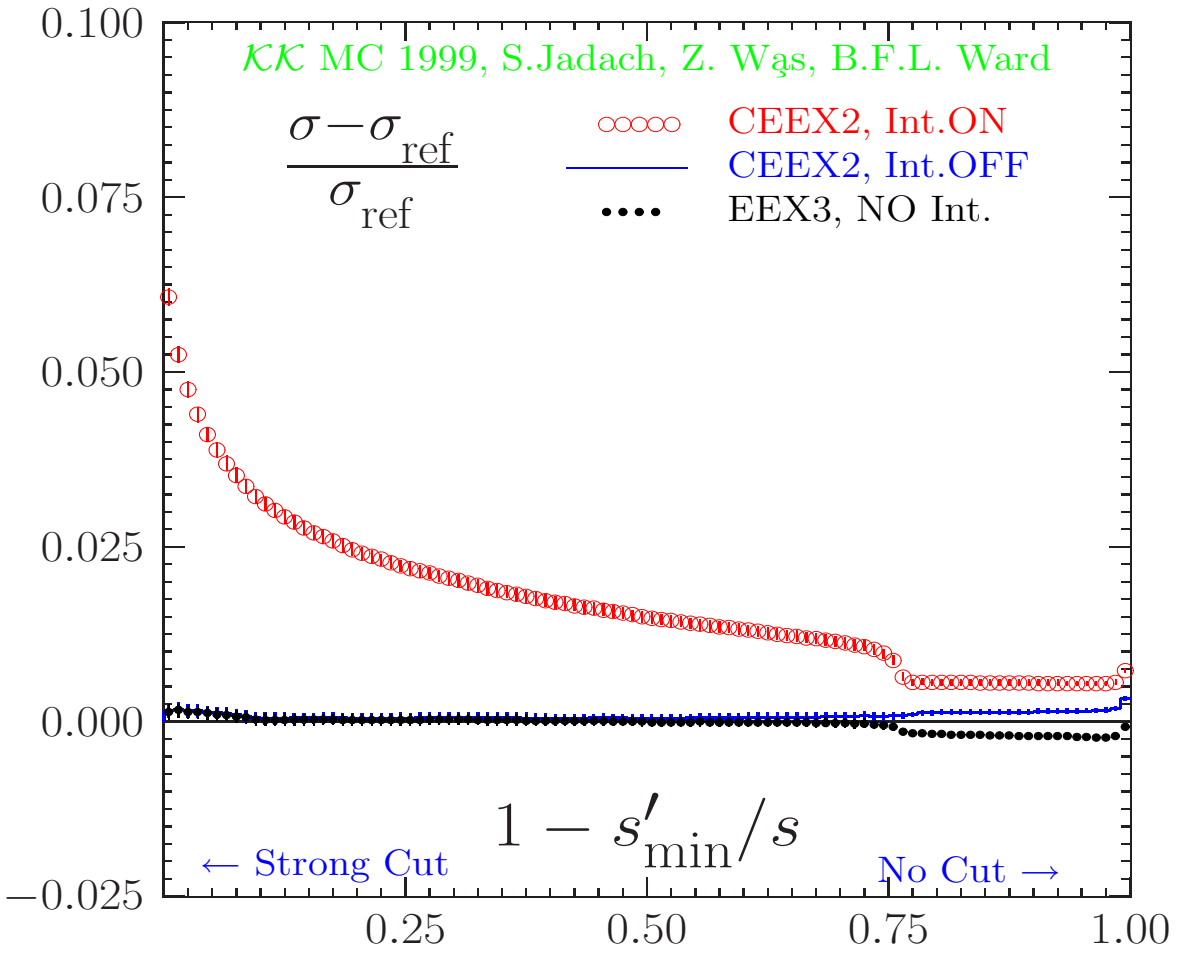
EEX3 is $\mathcal{O}(\alpha^3)_{\rm LL}$ EEX3 matrix element without ISR$\otimes$FSR interf.

$\mathcal{KK}$sem is semianalytical part of $\mathcal{KK}$. (Angle $\theta^\bullet$ is from Phys. Rev. **D41**, 1425 (1990).)

$v_{\rm max}$	$\mathcal{KK}$sem Refer.	$\mathcal{O}(\alpha^3)_{\rm EEX3}$	$\mathcal{O}(\alpha^2)_{\rm CEEX}$ intOFF	$\mathcal{O}(\alpha^2)_{\rm CEEX}$
	$\sigma(v_{\rm max})$ [pb]			
0.01	1.6712 ± 0.0000	1.6736 ± 0.0018	1.6738 ± 0.0018	1.7727 ± 0.0021
0.10	2.5198 ± 0.0000	2.5205 ± 0.0020	2.5210 ± 0.0020	2.6009 ± 0.0024
0.30	3.0616 ± 0.0000	3.0626 ± 0.0022	3.0634 ± 0.0022	3.1243 ± 0.0026
0.50	3.3747 ± 0.0000	3.3745 ± 0.0022	3.3761 ± 0.0022	3.4254 ± 0.0026
0.70	3.7223 ± 0.0000	3.7214 ± 0.0022	3.7249 ± 0.0022	3.7648 ± 0.0027
0.90	7.1430 ± 0.0000	7.1284 ± 0.0022	7.1530 ± 0.0022	7.1821 ± 0.0026
0.99	7.6136 ± 0.0000	7.5974 ± 0.0021	7.6278 ± 0.0021	7.6567 ± 0.0026
	$A_{\rm FB}(v_{\rm max})$			
0.01	0.5654 ± 0.0000	0.5661 ± 0.0012	0.5661 ± 0.0012	0.6121 ± 0.0014
0.10	0.5664 ± 0.0000	0.5667 ± 0.0009	0.5667 ± 0.0009	0.5931 ± 0.0011
0.30	0.5692 ± 0.0000	0.5694 ± 0.0008	0.5693 ± 0.0008	0.5864 ± 0.0010
0.50	0.5744 ± 0.0000	0.5744 ± 0.0008	0.5743 ± 0.0008	0.5870 ± 0.0009
0.70	0.5863 ± 0.0000	0.5858 ± 0.0007	0.5857 ± 0.0007	0.5953 ± 0.0008
0.90	0.3105 ± 0.0000	0.3107 ± 0.0004	0.3100 ± 0.0004	0.3176 ± 0.0004
0.99	0.2851 ± 0.0000	0.2856 ± 0.0003	0.2848 ± 0.0003	0.2918 ± 0.0004

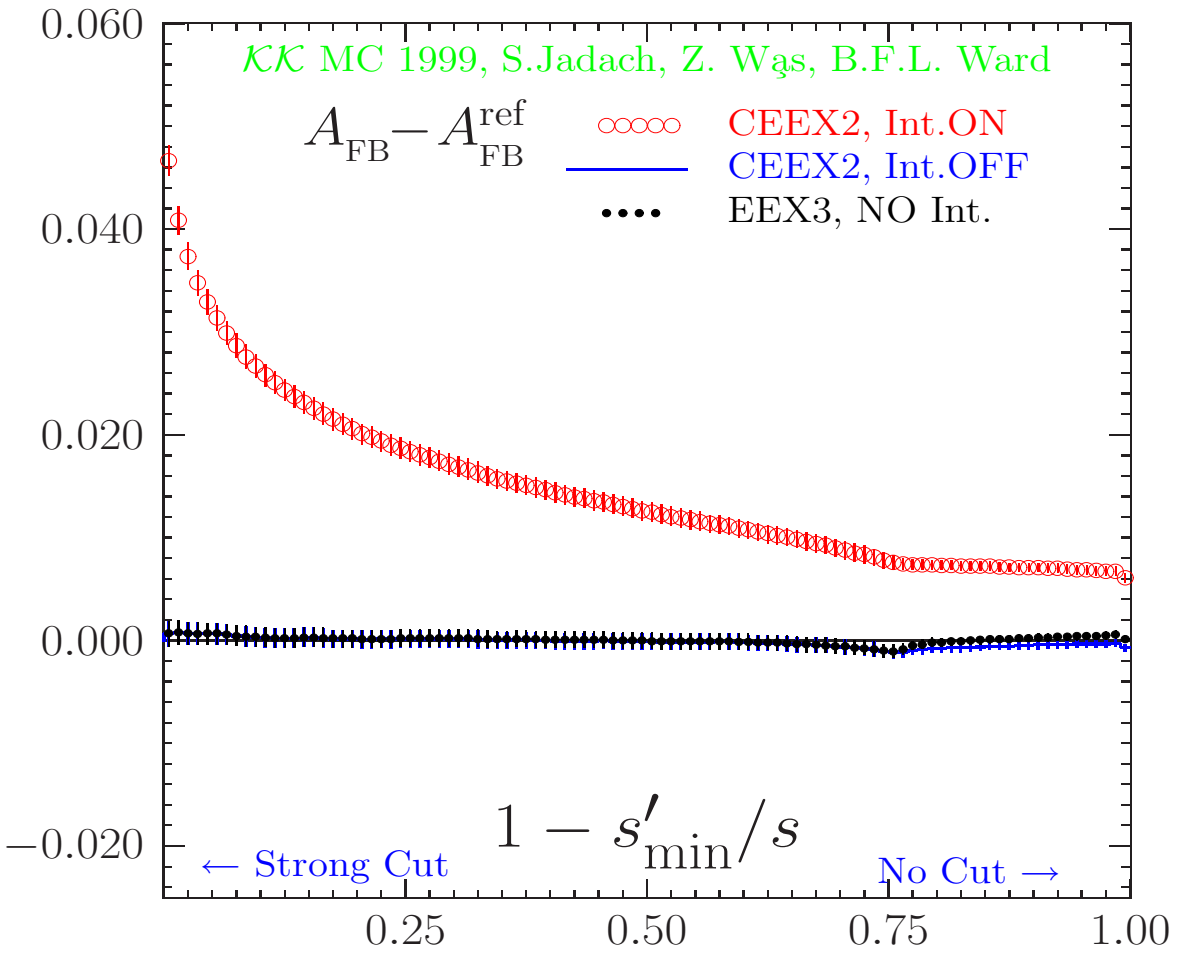
Total cross section σ, energy cut-off stydy

The same as in the table. No cut in $\theta^{\bullet}$. Ref. $\sigma_{\rm ref}$ = semianalytical of $\mathcal{KK}$sem.



Charge asymmetry $A_{\rm FB}$, energy cut-off study

The same as in the table. No cut in $\theta^{\bullet}$. Reference $A_{\rm FB}^{\rm ref}$ = semianalytical $\mathcal{KK}$sem.



Physical Precision of CEEX ISR

The difference between second and first order CEEX results for at 189GeV.

The energy cut is on s'/s, where $s' = m^2_{f\bar{f}}$.

Scattering angle is $\theta = \theta^{\bullet}$.

[Angle $\theta^{\bullet}$ is defined in Phys. Rev. **D41**, 1425 (1990)]