KKMC

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

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

Scattering angle for A_{FB} is $\theta = \theta^\bullet$. No cut in $\theta^\bullet$. E-W corr. in $\mathcal{KK}$ according to DIZET 6.x.
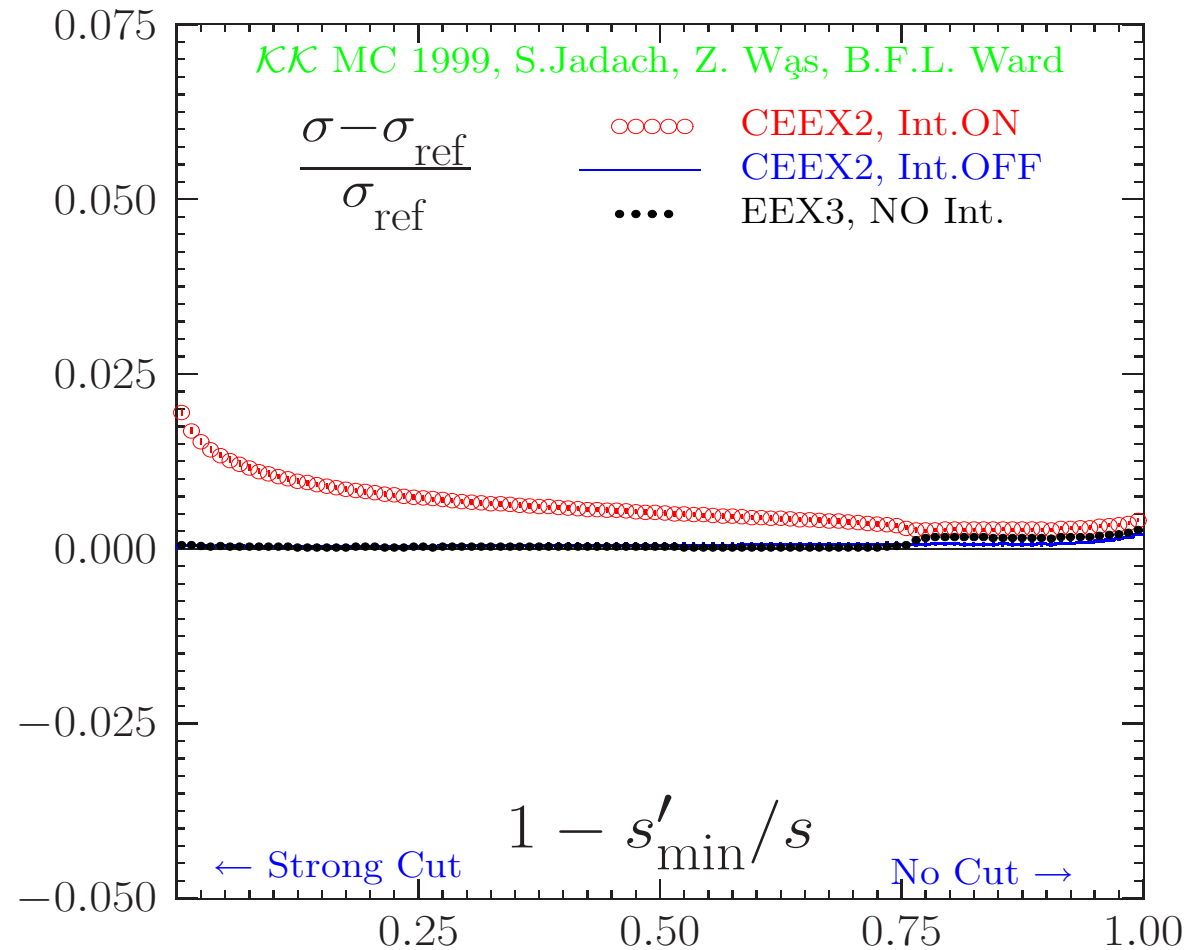
EEX3 is $\mathcal{O}(\alpha^3)_{\mathrm{LL}}$ EEX3 matrix element without ISR$\otimes$FSR interf.

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

$v_{\max}$	$\mathcal{KK}$sem Refer.	$\mathcal{O}(\alpha^3)_{\mathrm{EEX3}}$	$\mathcal{O}(\alpha^2)_{\mathrm{CEEX}}$ intOFF	$\mathcal{O}(\alpha^2)_{\mathrm{CEEX}}$
			$\sigma(v_{\max})$ [pb]	
0.01	0.9145 ± 0.0000	0.9150 ± 0.0004	0.9150 ± 0.0004	0.9323 ± 0.0004
0.10	1.0805 ± 0.0000	1.0807 ± 0.0004	1.0808 ± 0.0004	1.0920 ± 0.0004
0.30	1.1612 ± 0.0000	1.1615 ± 0.0004	1.1616 ± 0.0004	1.1691 ± 0.0004
0.50	1.1974 ± 0.0000	1.1977 ± 0.0004	1.1981 ± 0.0004	1.2036 ± 0.0004
0.70	1.2310 ± 0.0000	1.2312 ± 0.0004	1.2317 ± 0.0004	1.2357 ± 0.0004
0.90	1.6104 ± 0.0000	1.6128 ± 0.0003	1.6114 ± 0.0004	1.6148 ± 0.0004
0.99	1.6218 ± 0.0000	1.6254 ± 0.0003	1.6244 ± 0.0004	1.6277 ± 0.0004
			$A_{\mathrm{FB}}(v_{\max})$	
0.01	0.5883 ± 0.0000	0.5883 ± 0.0005	0.5883 ± 0.0005	0.6033 ± 0.0005
0.10	0.5882 ± 0.0000	0.5881 ± 0.0004	0.5881 ± 0.0004	0.5966 ± 0.0004
0.30	0.5879 ± 0.0000	0.5879 ± 0.0004	0.5879 ± 0.0004	0.5932 ± 0.0004
0.50	0.5875 ± 0.0000	0.5874 ± 0.0004	0.5875 ± 0.0004	0.5912 ± 0.0004
0.70	0.5848 ± 0.0000	0.5845 ± 0.0004	0.5846 ± 0.0004	0.5868 ± 0.0004
0.90	0.4736 ± 0.0000	0.4722 ± 0.0003	0.4728 ± 0.0003	0.4748 ± 0.0003
0.99	0.4710 ± 0.0000	0.4691 ± 0.0003	0.4697 ± 0.0003	0.4716 ± 0.0003

Total cross section σ, energy cut-off stydy

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

$\mathcal{KK}$ MC 1999, S.Jadach, Z. Wąs, B.F.L. Ward

$$\frac{\sigma - \sigma_{\mathrm{ref}}}{\sigma_{\mathrm{ref}}}$$

- ○○○○○ CEEX2, Int.ON
- —— CEEX2, Int.OFF
- •••• EEX3, NO Int.

$$1 - s'_{\mathrm{min}}/s$$

← Strong Cut   No Cut →

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

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

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$A_{\mathrm{FB}} - A_{\mathrm{FB}}^{\mathrm{ref}}$ ○○○○○ CEEX2, Int.ON
—— CEEX2, Int.OFF
•••• EEX3, NO Int.

$1 - s'_{\min}/s$

← Strong Cut   No Cut →
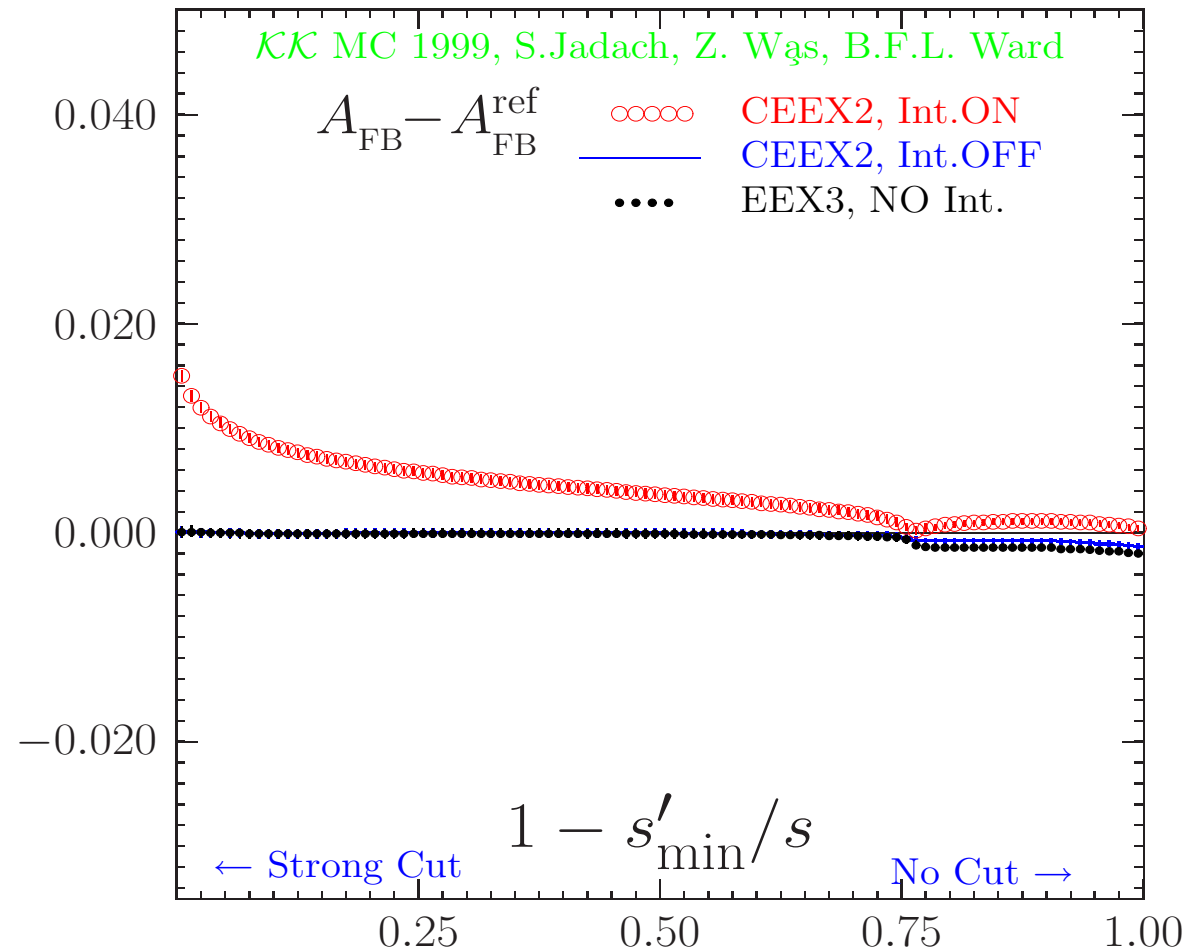
Physical Precision of CEEX ISR

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

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

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

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

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$$\frac{\sigma^{(2)} - \sigma^{(1)}}{\sigma^{(1)}}$$

—— IFI ON
—— IFI OFF

← Strong Cut $v_{\max}$ No Cut →

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$$A_{\mathrm{FB}}^{(2)} - A_{\mathrm{FB}}^{(1)}$$

—— IFI ON
—— IFI OFF

← Strong Cut $v_{\max}$ No Cut →

S. Jadach, B.F.L. Ward, Z. Wąs