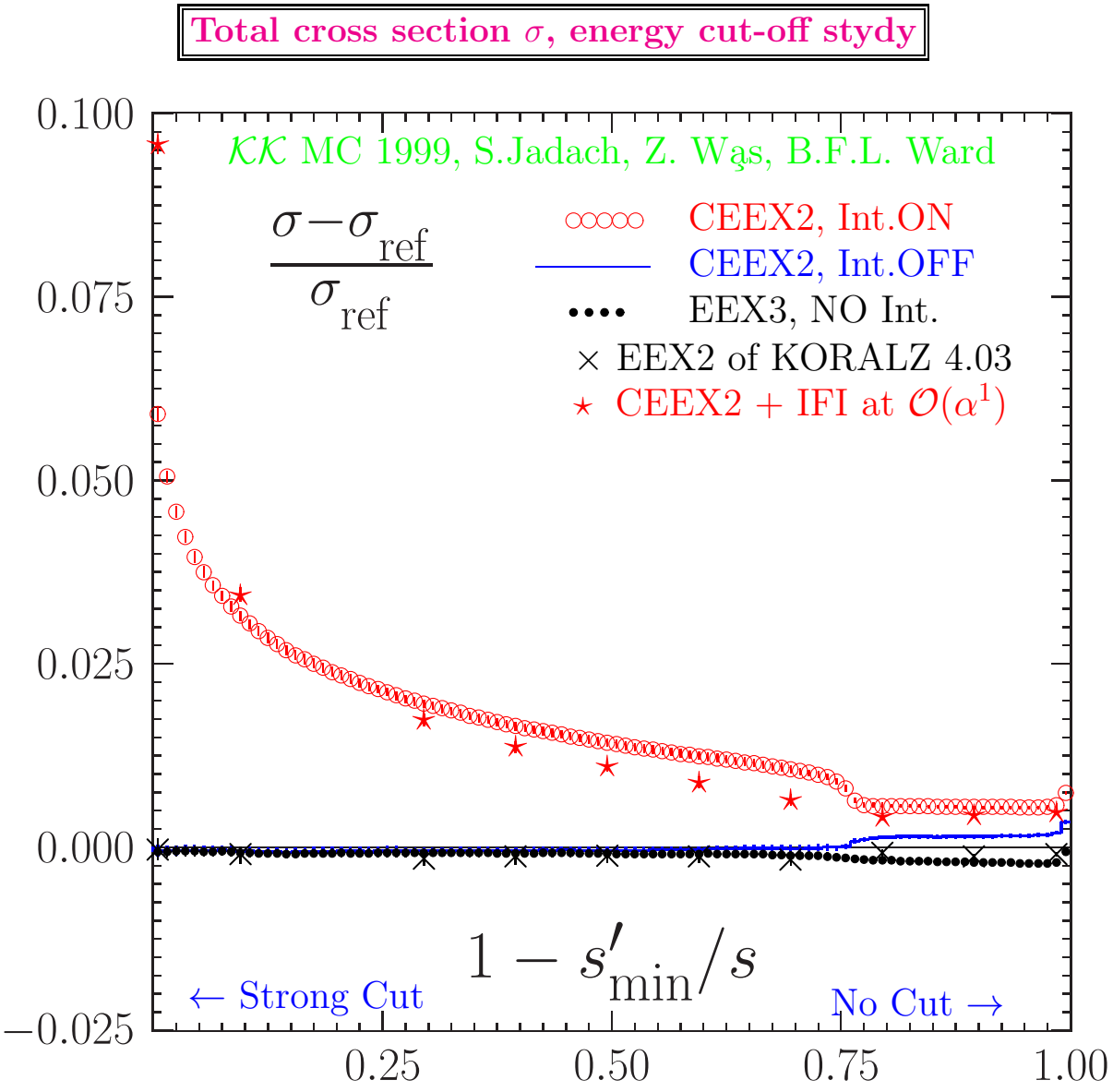
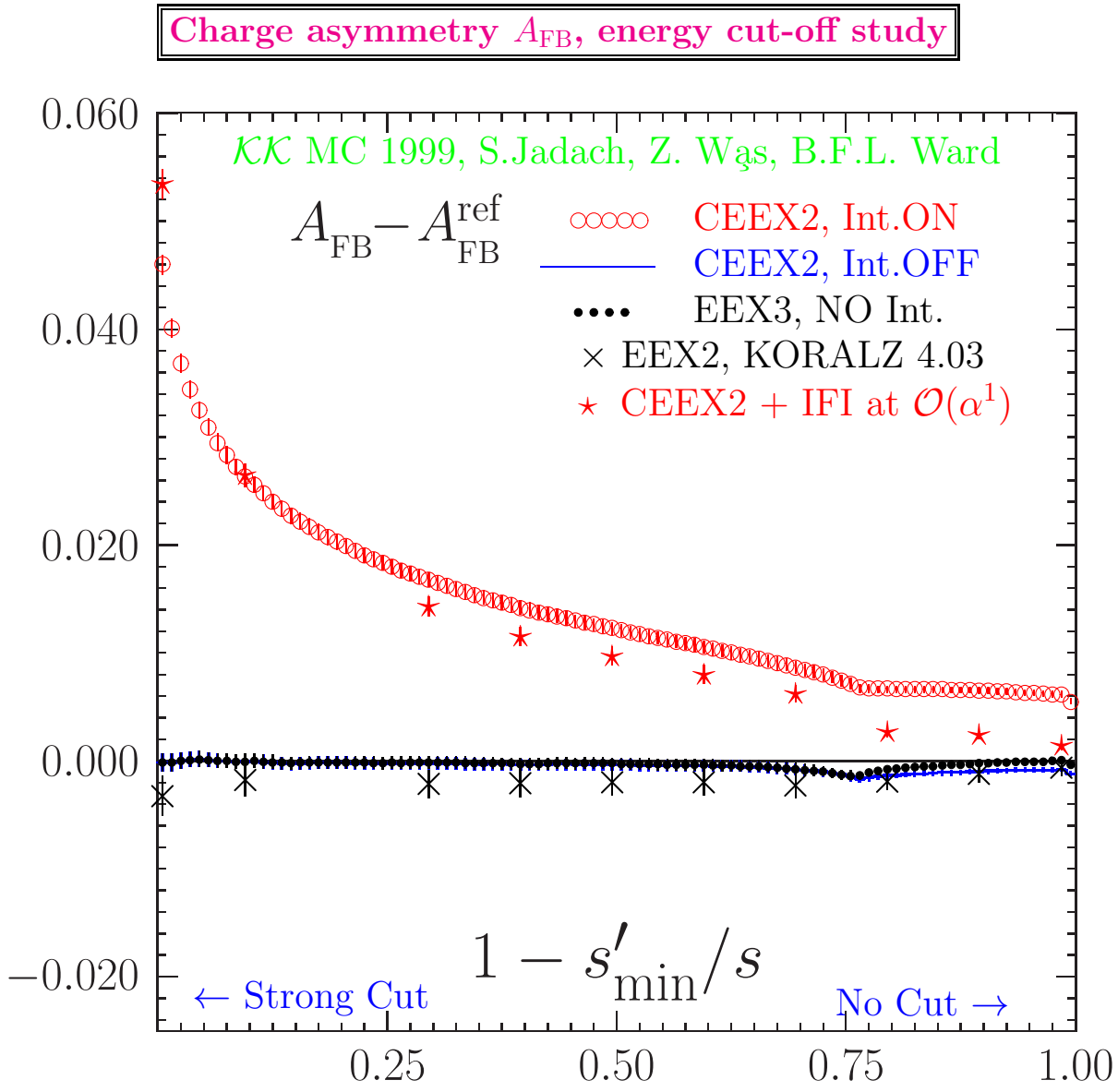
CEEX σ and $A_{\rm FB}$, energy cut-off study

$v_{\rm max}$	$\mathcal{KK}$sem Refer.	$\mathcal{O}(\alpha^3)_{\rm EEX3}$	$\mathcal{O}(\alpha^2)_{\rm CEEX}$ intOFF	$\mathcal{O}(\alpha^2)_{\rm CEEX}$	KORALZ	KORALZ Interf.
	$\sigma(v_{\rm max})$ [pb]					
0.01	1.6712 ± 0.0000	1.6701 ± 0.0012	1.6704 ± 0.0012	1.7699 ± 0.0014	0.9639 ± 0.0009	0.1610 ± 0.0000
0.10	2.5198 ± 0.0000	2.5180 ± 0.0013	2.5185 ± 0.0013	2.5992 ± 0.0016	2.1919 ± 0.0010	0.0880 ± 0.0000
0.30	3.0616 ± 0.0000	3.0594 ± 0.0014	3.0603 ± 0.0014	3.1217 ± 0.0017	2.7690 ± 0.0010	0.0545 ± 0.0000
0.50	3.3747 ± 0.0000	3.3717 ± 0.0014	3.3734 ± 0.0014	3.4228 ± 0.0017	3.0565 ± 0.0010	0.0385 ± 0.0000
0.70	3.7223 ± 0.0000	3.7182 ± 0.0015	3.7217 ± 0.0015	3.7618 ± 0.0018	3.3649 ± 0.0010	0.0246 ± 0.0000
0.90	7.1430 ± 0.0000	7.1285 ± 0.0014	7.1533 ± 0.0014	7.1822 ± 0.0017	6.3558 ± 0.0010	0.0210 ± 0.0000
0.99	7.6135 ± 0.0000	7.5979 ± 0.0014	7.6285 ± 0.0014	7.6570 ± 0.0017	6.7004 ± 0.0010	0.0213 ± 0.0000
	$A_{\rm FB}(v_{\rm max})$					
0.01	0.5654 ± 0.0000	0.5653 ± 0.0008	0.5653 ± 0.0008	0.6115 ± 0.0009	0.5765 ± 0.0013	0.1201 ± 0.0000
0.10	0.5664 ± 0.0000	0.5664 ± 0.0006	0.5663 ± 0.0006	0.5928 ± 0.0007	0.5784 ± 0.0006	0.0324 ± 0.0000
0.30	0.5692 ± 0.0000	0.5691 ± 0.0005	0.5690 ± 0.0005	0.5860 ± 0.0006	0.5818 ± 0.0005	0.0164 ± 0.0000
0.50	0.5744 ± 0.0000	0.5742 ± 0.0005	0.5741 ± 0.0005	0.5867 ± 0.0006	0.5868 ± 0.0005	0.0112 ± 0.0000
0.70	0.5863 ± 0.0000	0.5856 ± 0.0005	0.5855 ± 0.0005	0.5950 ± 0.0006	0.5972 ± 0.0004	0.0078 ± 0.0000
0.90	0.3105 ± 0.0000	0.3102 ± 0.0002	0.3095 ± 0.0002	0.3170 ± 0.0003	0.3260 ± 0.0002	0.0037 ± 0.0000
0.99	0.2851 ± 0.0000	0.2852 ± 0.0002	0.2843 ± 0.0002	0.2913 ± 0.0003	0.3039 ± 0.0002	0.0024 ± 0.0000

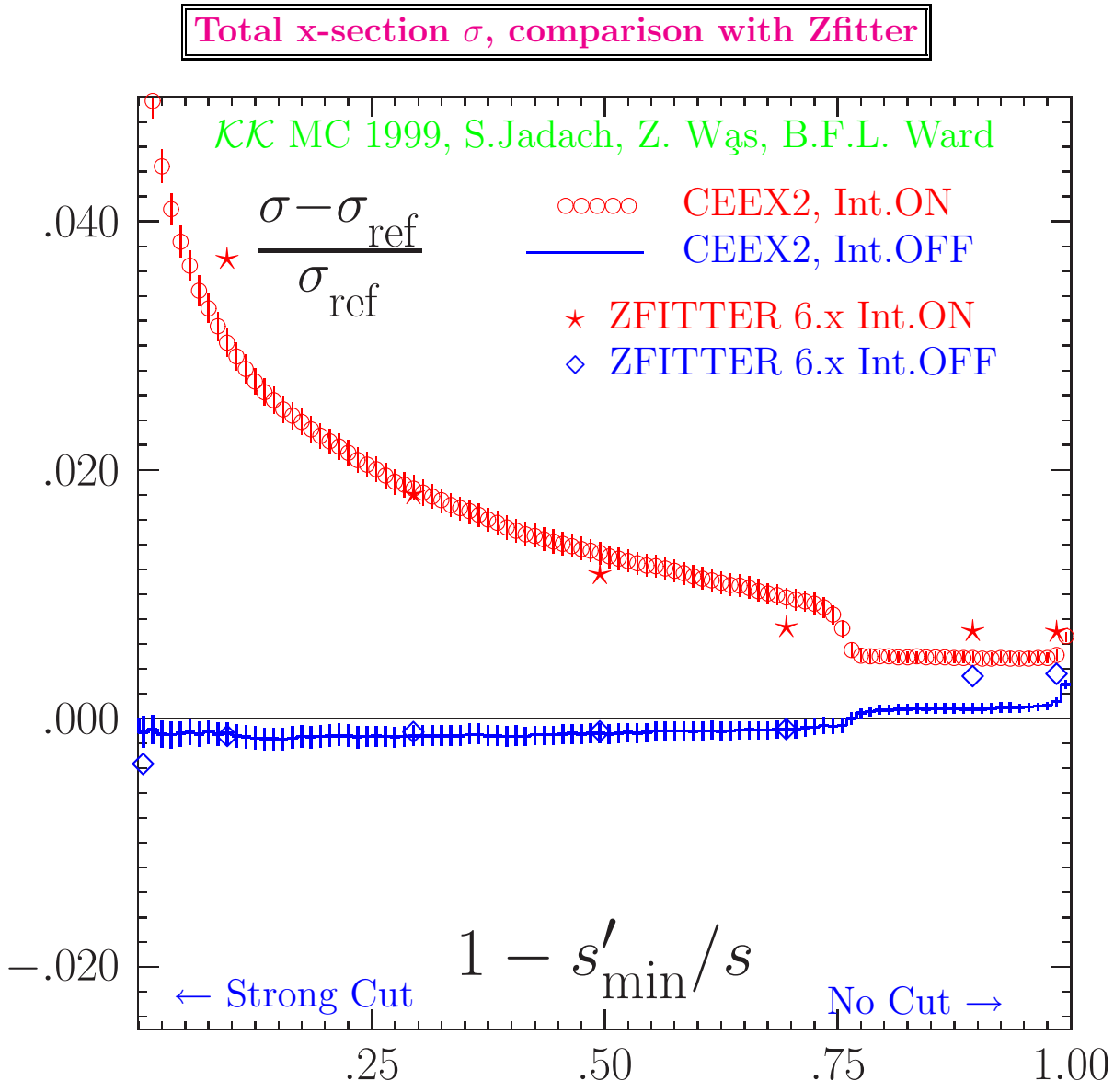
Process: $e^-e^+ \to f\bar{f}$, $f = \mu^-$, at 189GeV. Energy cut: $v < v_{\rm max}$, where $v = 1 - M^2_{f\bar{f}}/s$. Scattering angle for $A_{\rm FB}$ is $\theta = \theta^\bullet$. No cut in $\theta^\bullet$. E-W corr. in $\mathcal{KK}$ according to DIZET 6.x. $\mathcal{O}(\alpha^3)_{\rm LL}$ EEX3 matrix element in $\mathcal{KK}$ (without ISR*FSR interf.) $\mathcal{KK}$sem is semianalytical part of $\mathcal{KK}$. (Angle $\theta^\bullet$ is from Phys. Rev. **D41**, 1425 (1990).)



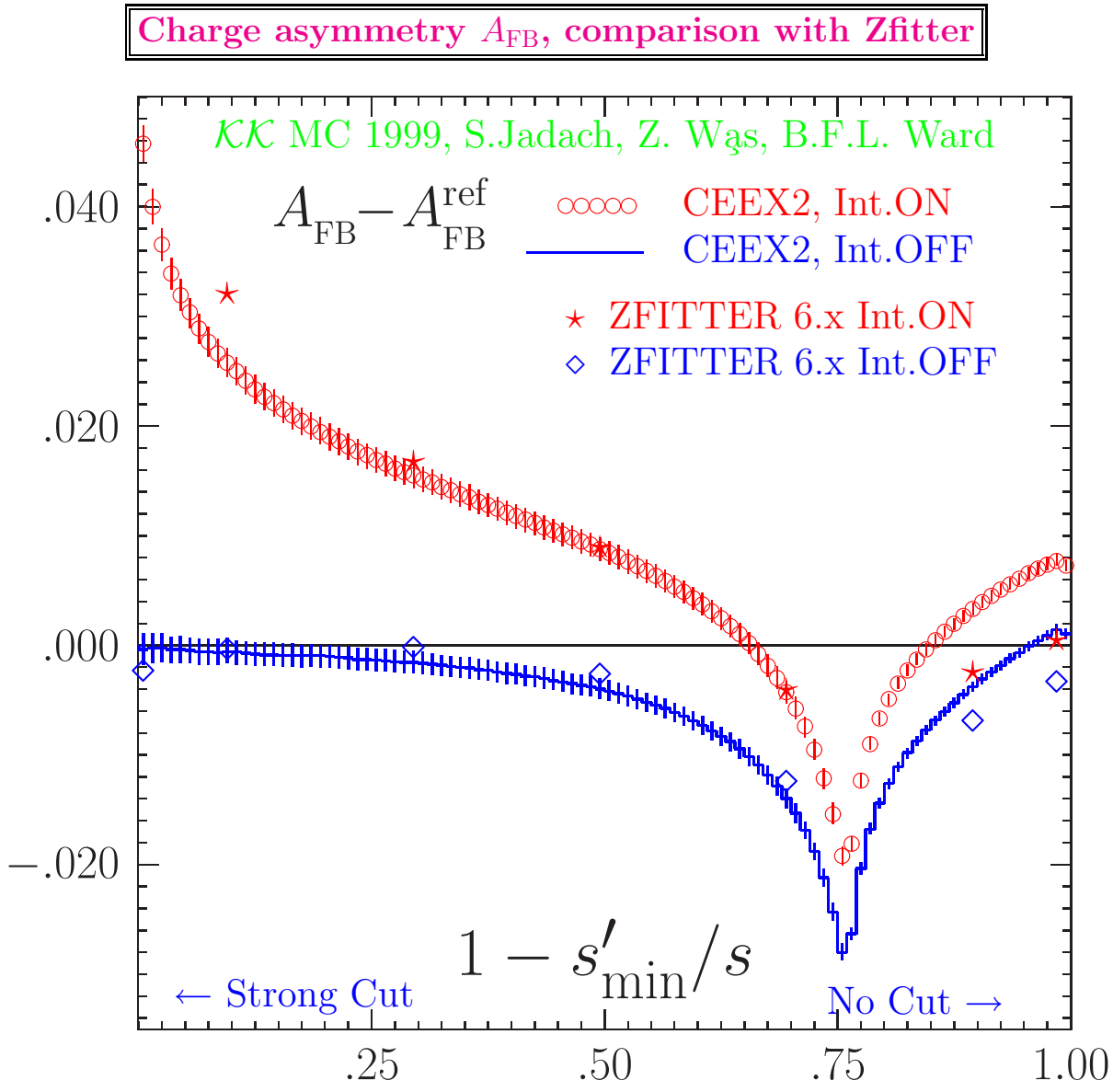
The same as in the table. The ISR⊗FSR interf. switched on/off wherever possible. No cut in $\theta^{\bullet}$. Reference $\sigma_{\rm ref}$ = semianalytical of $\mathcal{KK}$sem, (no ISR⊗FSR, up to $\mathcal{O}(\alpha^3)_{\rm LL}$, JSW exponentiation). EEX2 data points from KORALZ/YFS3 version 4.03 (QED up to $\mathcal{O}(\alpha^2)_{\rm LL}$, ISR⊗FSR off).



The same as in the table. The ISR⊗FSR interf. switched on/off wherever possible. No cut in $\theta^{\bullet}$. Reference $A_{\rm FB}^{\rm ref}$ = semianalytical $\mathcal{KK}$sem, (no ISR⊗FSR, up to $\mathcal{O}(\alpha^3)_{\rm LL}$, JSW exponentiation). EEX2 data points are from KORALZ/YFS3 version 4.03 (QED up to $\mathcal{O}(\alpha^2)_{\rm LL}$, ISR⊗FSR off.).

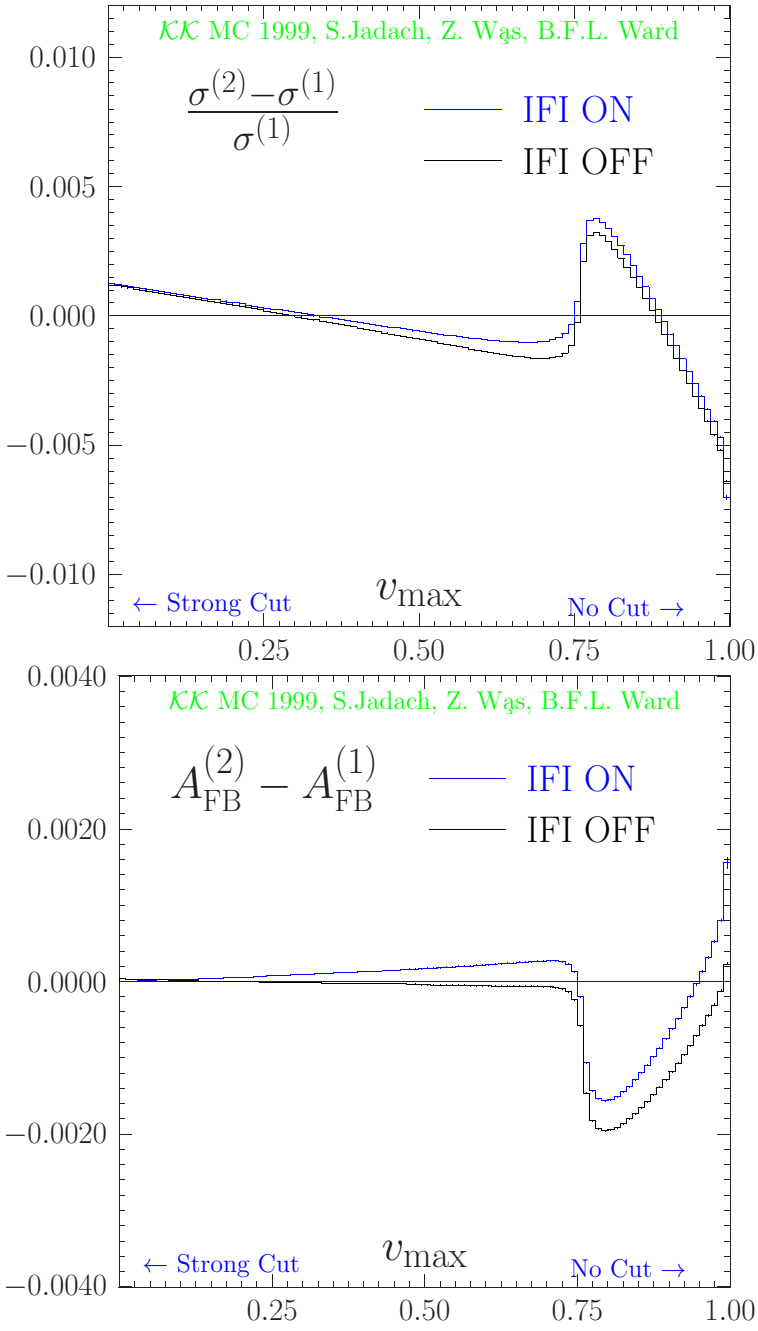


Comparison with Zfitter 6.xx. The ISR⊗FSR interf. switched on/off. No cut in θ_1. Reference $\sigma_{\rm ref}$ = semianalytical of $\mathcal{KK}$sem, (no ISR⊗FSR, up to $\mathcal{O}(\alpha^3)_{\rm LL}$, JSW exponentiation).



Comparison with Zfitter 6.xx. The ISR⊗FSR interf. switched on/off. No cut in θ_1. Reference $A_{\rm FB}^{\rm ref}$ = semianalytical $\mathcal{KK}$sem, (no ISR⊗FSR, up to $\mathcal{O}(\alpha^3)_{\rm LL}$, JSW exponentiation).

Physical Precision of CEEX, NEW!!!



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)]