

Updates on activities.

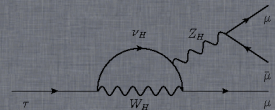
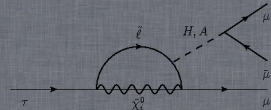
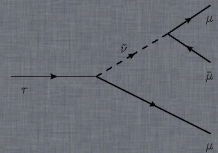
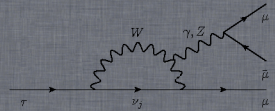
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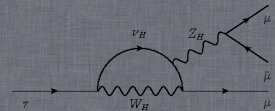
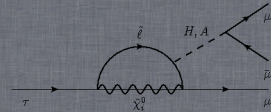
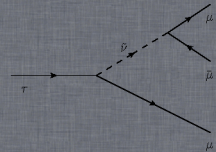
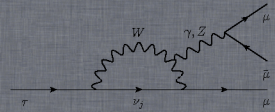


University of
Zurich^{UZH}



$K^*_{\mu\mu}$ toy MC results.

$K^*_{\mu\mu}$ Unfolding



- Chris Langenburgh prepared a "official TOY MC" <- LOL
- With unfolding of the angles done by him.
- Last week I wasted analysing this MC.

Strategy

- First try to get back the parameters that were put inside the MC.
- X-check the unfolding.
- Perform a fit and MM.

S_4 results

q^2	S_4^{true}	S_4^{fit}	S_4^{fold}	S_4^{MM}
[0.1, 1.0]	-0.0884	-0.0877 ± -0.0013	-0.0874 ± 0.0010(1.0)	-0.0873 ± 0.0010(1.1)
[1.1, 2.0]	-0.0481	-0.0430 ± -0.0021	-0.0462 ± 0.0017(1.1)	-0.0477 ± 0.0018(0.2)
[2.0, 3.0]	0.0480	0.0447 ± -0.00210	0.0476 ± 0.0016(0.25)	0.0478 ± 0.0019(0.1)
[3.0, 4.0]	0.1255	$X \pm Y$	0.1253 ± 0.0016(0.1)	0.1262 ± 0.0019(0.4)
[4.0, 5.0]	0.1765	$X \pm Y$	0.1742 ± 0.0015(1.5)	0.1760 ± 0.0018(0.3)
[5.0, 6.0]	0.2089	$X \pm Y$	0.2065 ± 0.0015(1.6)	0.2081 ± 0.0017(0.9)
[6.0, 7.0]	0.2295	$X \pm Y$	0.2283 ± 0.0014(0.9)	0.2313 ± 0.0016(1.1)
[7.0, 8.0]	0.2609	$X \pm Y$	0.2428 ± 0.0014(13)	0.2441 ± 0.0016(10.5)
[15.0, 16.0]	0.2822	$X \pm Y$	0.2817 ± 0.0012(0.4)	0.2819 ± 0.0014(0.2)
[16.0, 17.0]	0.2888	$X \pm Y$	0.2878 ± 0.0013(0.8)	0.2890 ± 0.0015(0.1)
[17.0, 18.0]	0.2987	$X \pm Y$	0.2987 ± 0.0013(0.0)	0.2980 ± 0.0016(0.4)
[18.0, 19.0]	0.3139	$X \pm Y$	0.3150 ± 0.0015(0.7)	0.3156 ± 0.0020(0.85)

S_5 results

q^2	S_5^{true}	S_5^{fit}	S_5^{fold}	S_5^{MM}
[0.1, 1.0]	0.2253	$0.1715 + -0.0176$	$0.2253 \pm 0.0009(0.0)$	$0.2260 \pm 0.0009(0.8)$
[1.1, 2.0]	0.1652	$0.1421 + -0.0284Y$	$0.1674 \pm 0.0016(1.4)$	$0.1671 \pm 0.0018(1.1)$
[2.0, 3.0]	-0.0287	$0.0370 + -0.1472$	$-0.0301 \pm 0.0017(0.8)$	$-0.0300 \pm 0.0019(0.7)$
[3.0, 4.0]	-0.1897	$X \pm Y$	$-0.1919 \pm 0.0016(1.4)$	$-0.1891 \pm 0.0019(0.3)$
[4.0, 5.0]	-0.2969	$X \pm Y$	$-0.2971 \pm 0.0015(0.1)$	$-0.2966 \pm 0.0018(0.3)$
[5.0, 6.0]	-0.3654	$X \pm Y$	$-0.3682 \pm 0.0014(2.0)$	$-0.3700 \pm 0.0017(2.7)$
[6.0, 7.0]	-0.4084	$X \pm Y$	$-0.4092 \pm 0.0013(0.6)$	$-0.4096 \pm 0.0016(0.8)$
[7.0, 8.0]	-0.4113	$X \pm Y$	$-0.4364 \pm 0.0012(21)$	$-0.4356 \pm 0.0015(16)$
[15.0, 16.0]	-0.3654	$X \pm Y$	$-0.3650 \pm 0.0011(0.4)$	$-0.3646 \pm 0.0012(0.3)$
[16.0, 17.0]	-0.3356	$X \pm Y$	$-0.3349 \pm 0.0011(0.6)$	$-0.3359 \pm 0.0013(0.2)$
[17.0, 18.0]	-0.2911	$X \pm Y$	$-0.2903 \pm 0.0013(0.6)$	$-0.2896 \pm 0.0014(1.1)$
[18.0, 19.0]	-0.2124	$X \pm Y$	$-0.2152 \pm 0.0016(1.8)$	$-0.2158 \pm 0.0018(1.9)$

S_7 results

q^2	S_7^{true}	S_7^{fit}	S_7^{fold}	S_7^{MM}
[0.1, 1.0]	0.0212	$0.0520 + -0.0176$	$0.0214 \pm 0.0009(0.2)$	$0.0208 \pm 0.0009(0.4)$
[1.1, 2.0]	0.0386	$0.0264 + -0.0285$	$0.0352 \pm 0.0016(2.1)$	$0.0348 \pm 0.0018(2.1)$
[2.0, 3.0]	0.0379	$-0.0670 + -0.1475$	$0.0351 \pm 0.0017(1.6)$	$0.0353 \pm 0.0019(1.4)$
[3.0, 4.0]	0.0341	$X \pm Y$	$0.0368 \pm 0.0017(1.6)$	$0.0363 \pm 0.0019(1.2)$
[4.0, 5.0]	0.0306	$X \pm Y$	$0.0293 \pm 0.0016(0.8)$	$0.0303 \pm 0.0018(0.6)$
[5.0, 6.0]	0.0284	$X \pm Y$	$0.0262 \pm 0.0016(1.4)$	$0.0263 \pm 0.0018(1.2)$
[6.0, 7.0]	0.0278	$X \pm Y$	$0.0286 \pm 0.0015(0.5)$	$0.0287 \pm 0.0017(0.5)$
[7.0, 8.0]	0.0000	$X \pm Y$	$0.0290 \pm 0.0015(19.3)$	$0.0287 \pm 0.0016(18)$
[15.0, 16.0]	0.0000	$X \pm Y$	$-0.0007 \pm 0.0014(0.5)$	$-0.0008 \pm 0.0014(0.6)$
[16.0, 17.0]	0.0000	$X \pm Y$	$-0.0026 \pm 0.0015(1.6)$	$-0.0026 \pm 0.0015(1.7)$
[17.0, 18.0]	0.0000	$X \pm Y$	$-0.0023 \pm 0.0016(1.6)$	$-0.0021 \pm 0.0017(1.2)$
[18.0, 19.0]	0.0000	$X \pm Y$	$-0.0021 \pm 0.0021(1.0)$	$-0.0015 \pm 0.0021(0.6)$

S_8 results

q^2	S_8^{true}	S_8^{fit}	S_8^{fold}	S_8^{MM}
[0.1, 1.0]	-0.0038	-0.0078 ± -0.0014	-0.0042 ± 0.0010(0.4)	-0.0040 ± 0.0010(0.2)
[1.1, 2.0]	-0.0107	-0.0234 ± -0.0021	-0.0142 ± 0.0017(2.1)	-0.0135 ± 0.0018(1.5)
[2.0, 3.0]	-0.0123	-0.0239 ± -0.0020	-0.0144 ± 0.0017(1.2)	-0.0149 ± 0.0019(0.3)
[3.0, 4.0]	-0.0121	$X \pm Y$	-0.0112 ± 0.0016(0.6)	-0.0117 ± 0.0019(0.2)
[4.0, 5.0]	-0.0114	$X \pm Y$	-0.0123 ± 0.0016(0.6)	-0.0129 ± 0.0018(0.8)
[5.0, 6.0]	-0.0110	$X \pm Y$	-0.0118 ± 0.0016(0.5)	-0.0115 ± 0.0018(0.3)
[6.0, 7.0]	-0.0110	$X \pm Y$	-0.0110 ± 0.0016(0.0)	-0.0107 ± 0.0017(0.2)
[7.0, 8.0]	0.0007	$X \pm Y$	-0.0112 ± 0.0015(7.0)	-0.0113 ± 0.0016(6.6)
[15.0, 16.0]	0.0003	$X \pm Y$	-0.0015 ± 0.0015(0.8)	-0.0016 ± 0.0015(0.9)
[16.0, 17.0]	0.0003	$X \pm Y$	-0.0020 ± 0.0016(1.1)	-0.0022 ± 0.0016(1.2)
[17.0, 18.0]	0.0002	$X \pm Y$	0.0023 ± 0.0018(1.2)	0.0022 ± 0.0018(1.1)
[18.0, 19.0]	0.0002	$X \pm Y$	-0.0007 ± 0.0022(0.2)	-0.0012 ± -0.0022(0.5)

WTH is going on with [7.0, 8.0] ? 1/3

- With those parameters from EOS the PDF is negative? <- checked , no
- Some boundary conditions? <- checked by simulating my toy, no thing going on there.
- The parametr that EOS gives you are not the one they simulated? <- YES!

WTH is going on with [7.0, 8.0] ? 2/3

- First I simulated MY toy MC:

Listing 1: My unofficial SHIT MC:

```
FL_1  0.527066 +/-  0.000247033
FL_2  0.527066 +/-  0.000247033
FL_3  0.52083  +/-  0.00159866
FL_4  0.525139 +/-  0.000307114
J3    -0.0246584 +/-  0.000335458      true value: -0.0248
J4    0.261117  +/-  0.000364695      true value: 0.2609
J5    -0.411436 +/-  0.000335284      true value: -0.4113
J6s_1 -0.411211 +/-  0.000281637      true value: -0.4113
J7    -0.000505415 +/-  0.000363604    true value: 0
J8    -0.000673747 +/-  0.000377374    true value: -0.0007
J9    0.000422372 +/-  0.0003356       true value: -0.0007
```

- PDF is fine, can be fitted(here MM).

WTH is going on with [7.0, 8.0] ? 3/3

- Author of this official TOY MC should repeat maths 1 at university.

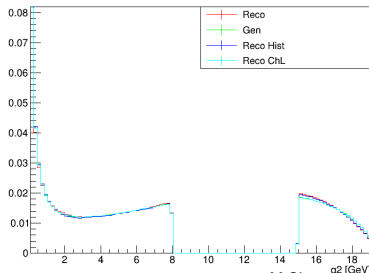
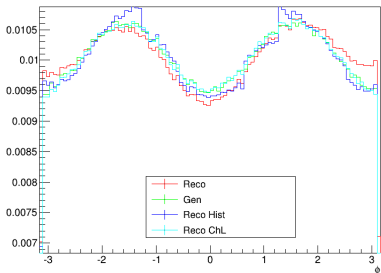
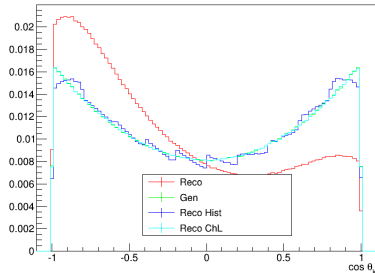
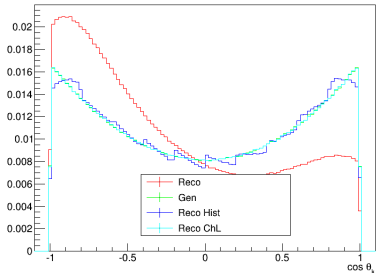
Listing 2: TABLE from email:

Q2	Q2	S4	S5	S7		
7.00	7.10	0.2375	-0.4250	-0.2818	0.0282	-0.0113
7.10	7.20	0.2388	-0.4275	-0.2890	0.0284	-0.0114
7.20	7.30	0.2399	-0.4299	-0.2960	0.0286	-0.0115
7.30	7.40	0.2411	-0.4321	-0.3030	0.0288	-0.0116
7.40	7.50	0.2422	-0.4343	-0.3098	0.0291	-0.0117
7.50	7.60	0.2432	-0.4363	-0.3165	0.0294	-0.0118
7.60	7.70	0.2442	-0.4383	-0.3230	0.0297	-0.0120
7.70	7.80	0.2451	-0.4401	-0.3295	0.0301	-0.0121
7.80	7.90	0.2460	-0.4418	-0.3358	0.0305	-0.0123
7.90	8.00	0.2623	-0.4199	-0.4330	0.0000	-0.0006
Full Bin:						
7.00	8.00	0.2609	-0.4113	-0.4113	0.0000	-0.0007

More x-checks

- Christoph also performed an unfolding.
- He parametrized the acceptance corrections using 7th order polynomials.
- Also made a check of this.
- On his "official TOY MC"
- Reweighed events($1/\epsilon$) to get back the true distribution.

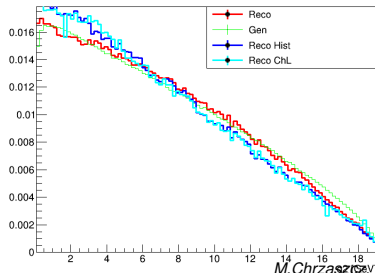
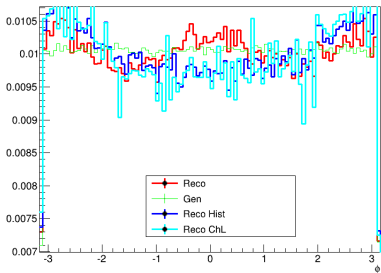
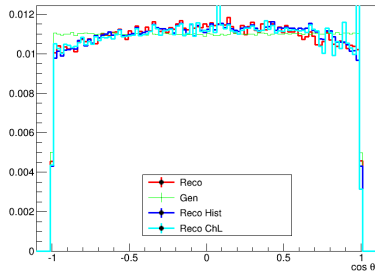
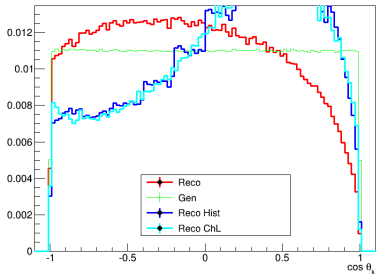
More x-checks



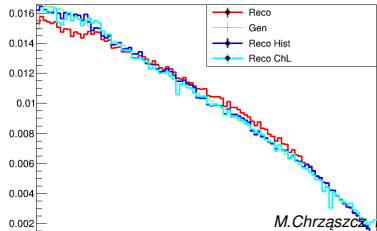
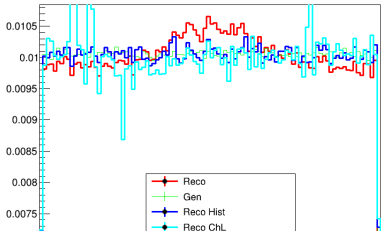
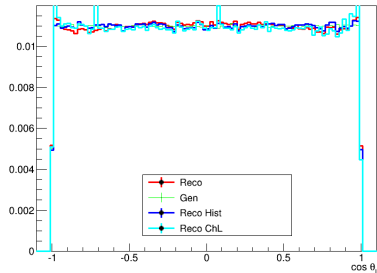
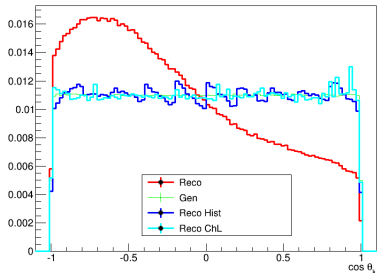
More x-checks

- Did they get finally something right?
- You Wish! -> NEXT SLIDE

Congrats



Magic happens when i don't require B^0 trueID



Update on analysis

$K^* \mu\mu$ Unfolding

M.Chrząszcz, N.Serra 2014

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Summary

- Big congratulations to authors of this MC.
- How many bugs did I miss?

