Updates on activities.

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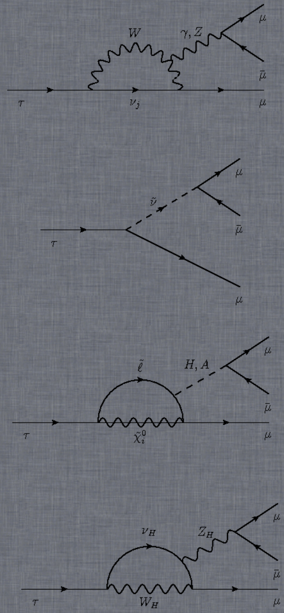
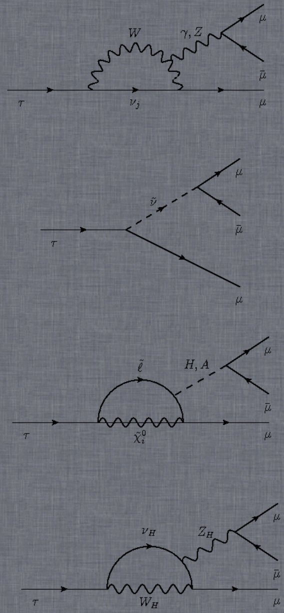


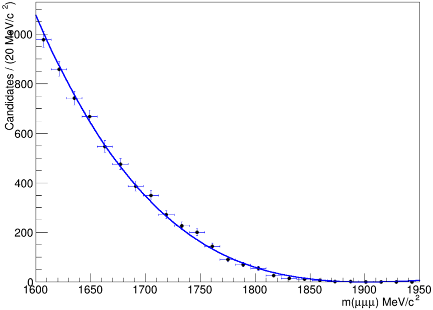
$\tau \rightarrow 3\mu$ many solutions

$\mathrm{K}^*\mu\mu$



$\mathrm{D_s} \to \eta(\mu\mu\gamma)\mu\nu$

- Last time I showed you the fits with η background.
- Now the fits are updated with the η calibrated $\mathrm{D_s} \to \eta(\mu\mu\gamma)\mu\nu$ yield.
- Still everything looks fine.



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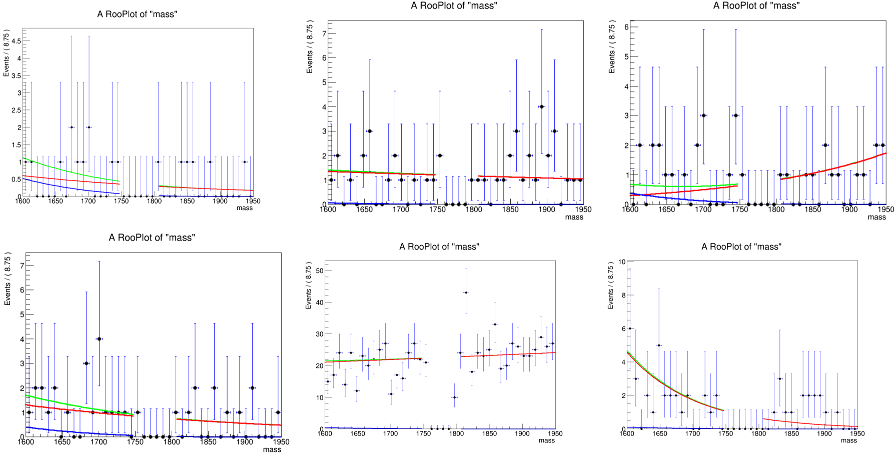
$\mathbf{D_s} \to \eta(\mu\mu\gamma)\mu\nu$



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Expected limit

- Note was send to conveners on Monday.

- We decided to give two limits with $\mathrm{D_s} \to \eta(\mu\mu\gamma)\mu\nu$ and with η veto.

V0 of the note(no systematics in the limit):

1. η veto: $Br(\mu\mu\mu) < 4.8 \times 10^{-8}$
2. η: $Br(\mu\mu\mu) < 4.7 \times 10^{-8}$

Yesterday I evaluated the limits with background systematics. The limits gets around: 5.1×10^{-8}

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

- Recently every one had statistics problems.
- I felt alienated that i have none.
- Thank god that Nico provided some problem :)

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Nico hypothesis

We have our PDF:

$$PDF = \frac{d^4\Gamma}{dq^2 dcos\theta_k dcos\theta_l d\phi} = \frac{9}{32\pi}(J_{1s}sin^2\theta_k + J_{1c}cos^2\theta_k + (J_{2s}sin^2\theta_k + J_{2c}cos^2)cos2\theta_l + J_3 sin^2\theta_k sin^2\theta_l cos2\phi + J_4 sin2\theta_k sin\theta_l cos\phi + J_5 sin2\theta_k sin\theta_l cos\phi + (J_{6s}sin^2\theta_k + J_{6c}cos^2\theta_k)cos\theta_l + J_7 sin2\theta_k sin\theta_l sin\phi + J_8 sin2\theta_k sin2\theta_l sinphi + J_9 sin^2\theta_k sin^2\theta_l sin2\phi) \quad (1)$$

And corresponding moments measured moments: M_i^R corresponding to the i^{th} moment. Nicos hypothesis: The true Moments: $M_i^T = A_j^i M_j^R$. But he can't prove it and it looks insane at the first looks. So in the process of proving he is wrong I proved that this is true.

Nico hypothesis, proof

So the true moments: $M_i^T = \int PDFf_i = J_i \int f_i^2 = J_i \times const$ Now for the measurements you need to have some efficiency: $\epsilon(dcos\theta_k, dcos\theta_l, d\phi)$, we assume it is C^∞. So one can Taylor expand this function.
The only thing I need to proof now is that the arbitrary element in the Taylor expansion can be write using all J_i in the first order: $M_i^R = \int PDFf_i \cos\theta_k^x \cos^y\theta_l \phi^z = \sum_j J_j \int f_i f_j \cos\theta_k^x \cos^y\theta_l \phi^z = \sum_j J_j const_j$
Which ends the proof. I calculated explicit matrix element correspond to $\cos\theta_k^x \cos^y\theta_l \phi^z$, but it's 3 pages long(in the attachment if one likes horrors).

Back to the unfolding

The unfolding for the method of moments can(and will) be done with 2 unfolding approaches.

- Unfolding using matrix.
- Unfolding using event weighting using the same weights as for the fits.
- We can check internal consistency.