$B^0 \to K^* \mu\mu$ update

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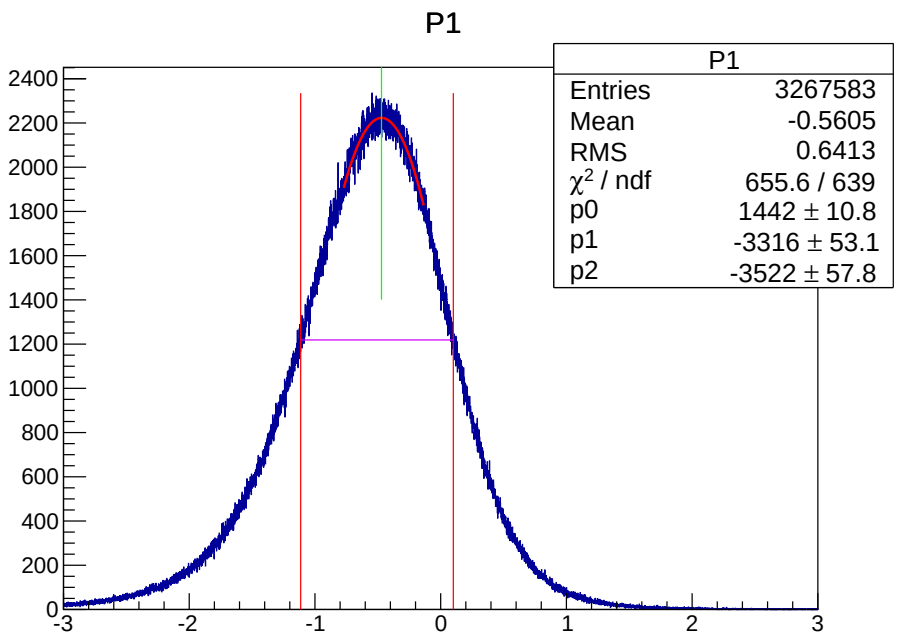
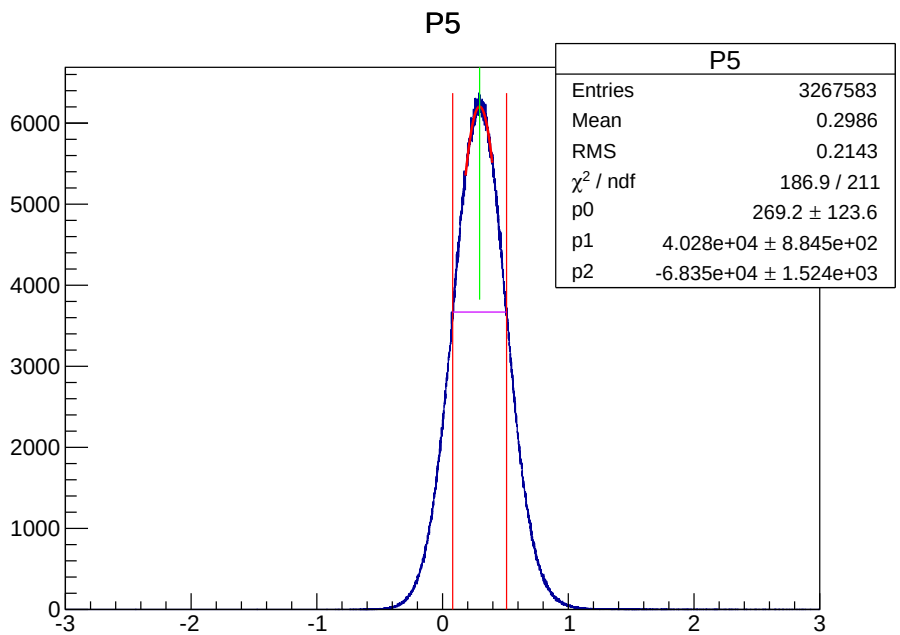
Reminder

- Last time I show you how to get the P_x distributions by simulating the bifurcated Gaussian.
- Now how to get the mean and error on this distribution.

Basics

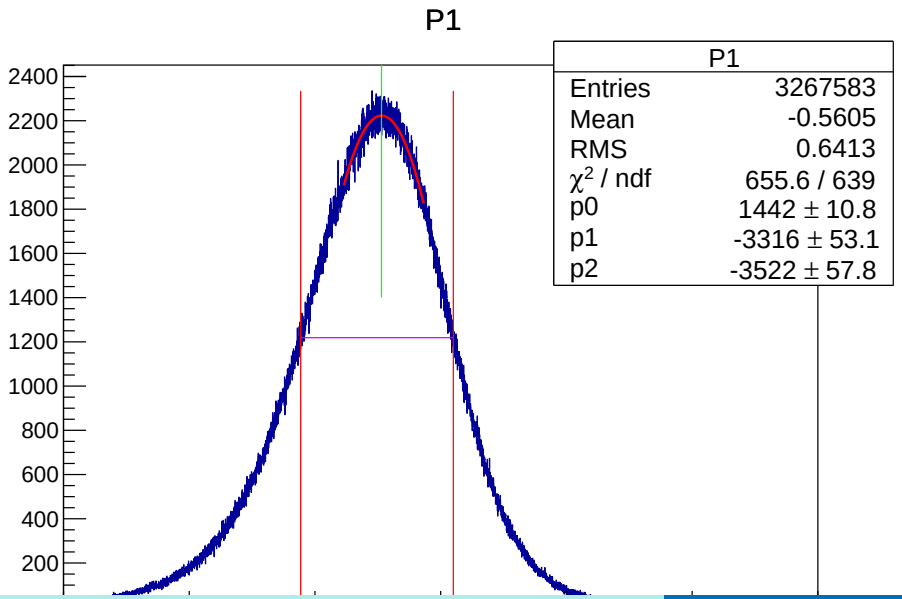
- We cannot just take the expected S_x and expected F_l and calculate: $P_x = \frac{S_x}{\sqrt{F_l(1-F_l)}}$ to get expected P_x.
- This will work only for Gaussian distributions(but not for bifurcated).
- Proposal: Fit a parabola in range $[-0.5\mathrm{RMS}, 0.5\mathrm{RMS}]$
- Get the mean.

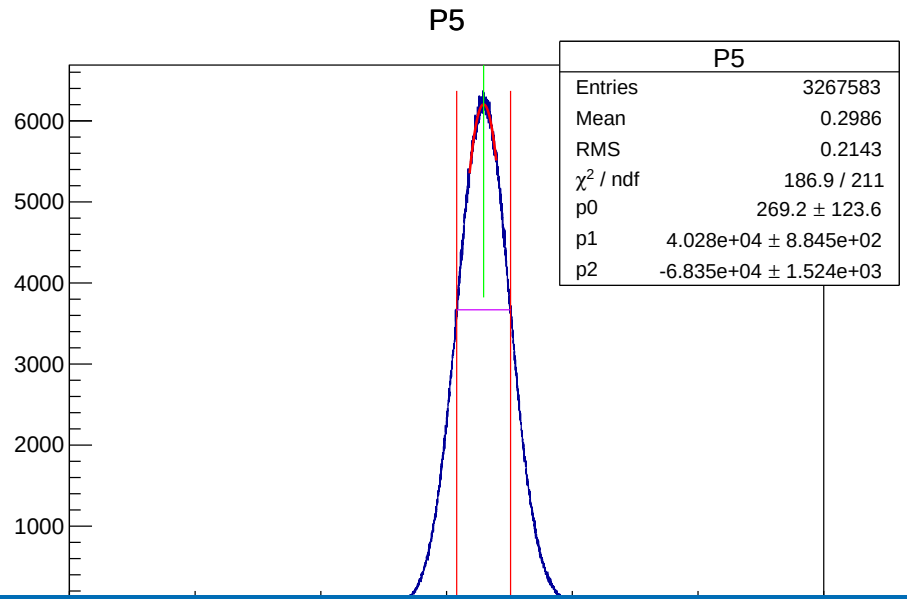




Confidence interval

- Now just need to find the 68.27% interval.
- Draw a horizontal line $y = y_{max} \times 0.9$
- Iterate among all bins and select bins with events that have $y_{i\ bin} > y$.
- Find y_{68} for which 68.27% have the property $\sum y_{i\ bin > y_{68}} = 0.6827$
- Find the two spots where the y_{68} line crosses the distribution.
- With current statistics I have $\mathcal{O}(10^{-4}$ error on the input S_x and $\mathcal{O}(10^{-3})$ on output P_x. I am not a pharmacist and don't need more.





Systematics

- To access systematics due to unfolding procedure we use the higher(+2) order acceptance correction function on high statistics MC.
- I noticed that some of the weights $(1/eff)$ are super large (> 100) or even negative which fucks up our distributions and creates larger systematics then it should be.
- Repeated this study rejecting this events.

q^2	F_l	S_3	S_4	S_5	S_6	S_7	S_8	S_9
0	0.0022	0.005	0.0003	0.0077	0.00664993	0.00805836	0.000222794	0.00325143
1	0.0048	0.001	0.0014	0.0051	0.0088697	0.00362942	0.00485902	0.000377345
2	0.0004	0.0001	0.00013	0.0056	0.00466685	0.00142986	0.000377415	0.00220193
3	0.0002	0.0012	0.0007	0.0017	6.60946e-05	0.00167783	0.00110383	0.00211203
4	0.002	0.0004	0.0005	0.0015	0.000386727	0.000966386	0.000230578	0.00101049
5	0.006	0.0011	0.0007	0.0026	0.00147745	0.00164066	0.00157731	0.000490769
6	0.008	0.0019	0.0008	0.0024	0.0029359	0.00333371	0.00191923	1.9902e-05
7	0.0062	0.0015	0.0002	0.0011	0.00369644	0.00283867	0.00161656	0.000536357
8	0.0035	0.0037	0.0017	0.0046	0.00378288	0.000535576	0.00400356	0.00407972
9	0.005	0.0001	0.0004	0.0010	0.000953251	0.00501146	0.00438955	0.00337069
10	0.0011	0.0044	0.002	0.0060	0.00595211	0.0101793	3.03904e-05	0.00129358
11	0.0021	0.0018	0.0001	0.0020	0.000494505	0.00524494	0.00823059	0.00597133