Input Output Check

Xingyu Zhou

xyzhou@ihep.ac.cn

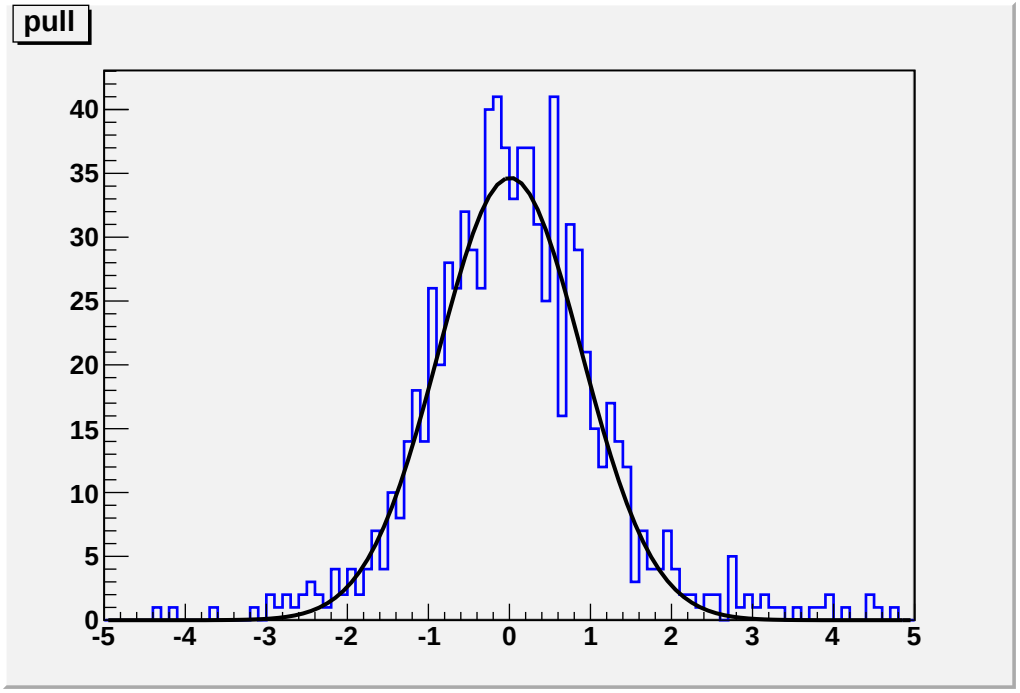
June 29, 2016

Outline

Method

- Using the Mathematica function MultinormalDistribution, we sample 1000 groups of correlated cross sections
- Each group has 15 cross sections of $e^+e^- \to e^+e^-$ and 15 cross sections of $e^+e^- \to \mu^+\mu^-$.
- The mean values used for sampling are evaluated according to the theorectial formulas with $\Gamma_{tot} = 92.1keV$, $\Gamma_{ll} = 5.51keV$ (they are the input values of parameters).
- The covariance matrix are just the 30×30 covariance matrix of experimental cross sections measurement.
- Check the pull distributions of parameters: Γ_{tot}, Γ_{ll}, $\Gamma_{ee}/\Gamma_{\mu\mu}$.
- Now 862 groups have been fitted successfully.

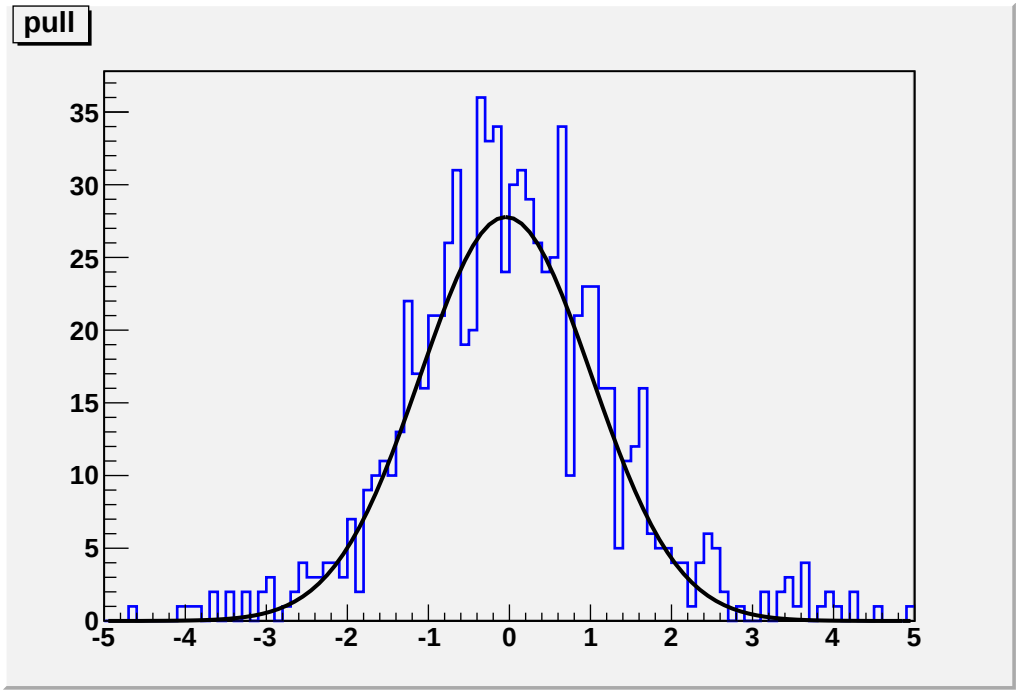
Results — Γ_{tot}



FCN=79.7413 FROM MIGRAD	STATUS=CONVERGED	75 CALLS	76 TOTAL
EDM=1.93824e-10	STRATEGY= 1	ERROR MATRIX ACCURATE	

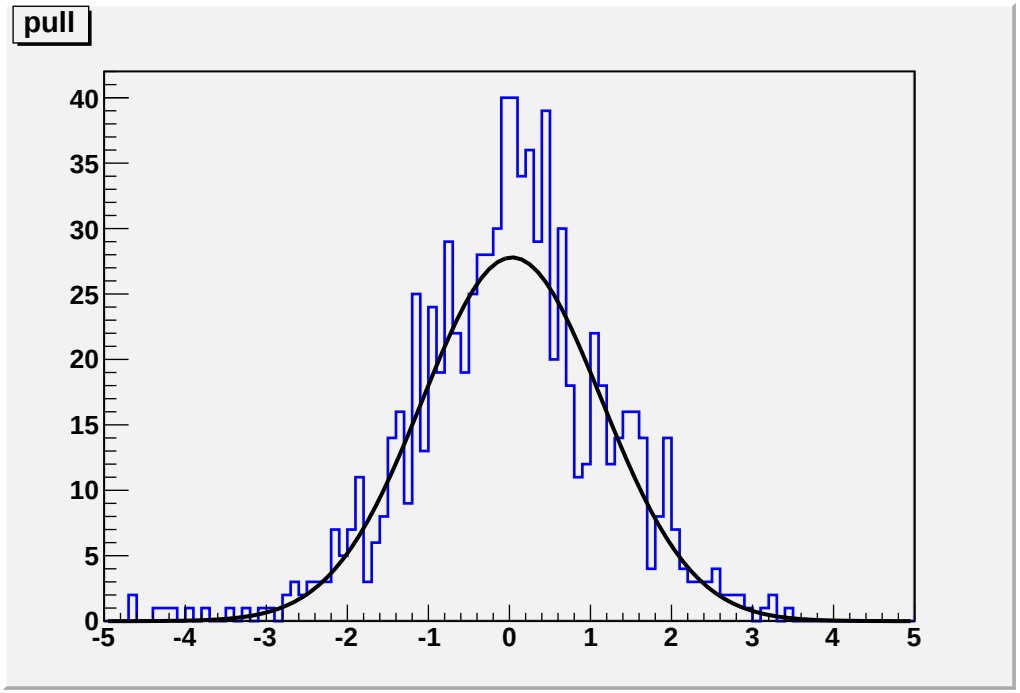
EXT NO.	PARAMETER NAME	VALUE	ERROR	STEP SIZE	FIRST DERIVATIVE
1	Constant	3.46576e+01	1.65462e+00	5.49343e-03	2.23142e-06
2	Mean	7.90177e-03	3.21239e-02	1.40452e-04	-3.43565e-04
3	Sigma	8.82734e-01	2.77540e-02	3.05298e-05	2.10844e-03

Results — $\Gamma_{//}$




```
FCN=102.925 FROM MIGRAD    STATUS=CONVERGED      77 CALLS          78 TOTAL
                     EDM=2.93828e-12    STRATEGY= 1      ERROR MATRIX ACCURATE
 EXT PARAMETER                                   STEP         FIRST
 NO.   NAME      VALUE            ERROR          SIZE      DERIVATIVE
  1  Constant     2.77837e+01   1.38217e+00   5.10789e-03  -8.00561e-09
  2  Mean        -4.31804e-02   3.99025e-02   1.98095e-04  -5.41139e-05
  3  Sigma        1.05786e+00   3.65630e-02   3.82322e-05   1.21861e-04
```

Results — $\Gamma_{ee}/\Gamma_{\mu\mu}$




```
FCN=87.9775 FROM MIGRAD    STATUS=CONVERGED      68 CALLS          69 TOTAL
                     EDM=4.14617e-10    STRATEGY= 1      ERROR MATRIX ACCURATE
 EXT PARAMETER                                   STEP         FIRST
 NO.   NAME      VALUE            ERROR          SIZE      DERIVATIVE
  1  Constant     2.77968e+01   1.36446e+00   4.61633e-03   1.70719e-05
  2  Mean         3.29719e-02   4.08508e-02   1.87811e-04  -2.43260e-05
  3  Sigma        1.10906e+00   3.83685e-02   3.75654e-05   3.50981e-03
```

Thanks for your attention !