Analysis with nanoDSTs

- **Making nanoDSTs**
  - **Scheme**
  - **Last improvements**
- **Analyzing nanoDSTs**
  - **Current procedure**
  - **Analysis Framework : MWGana**
  - **A new macro for background estimation**

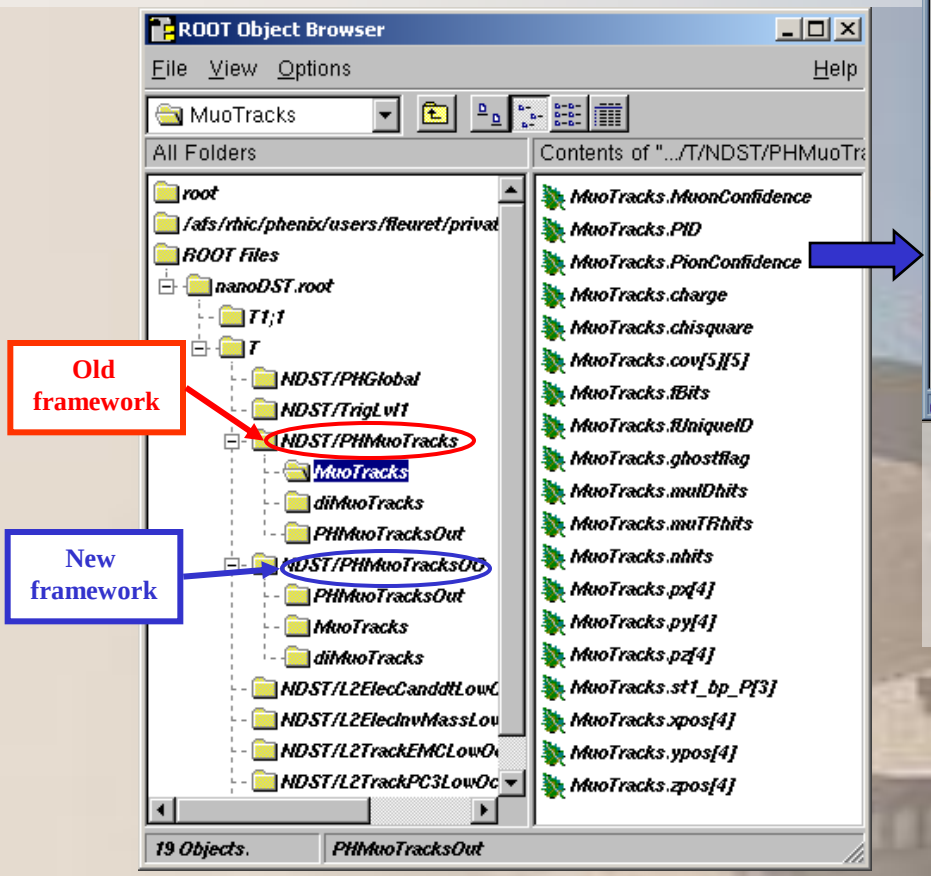
Analysis with nanoDSTs

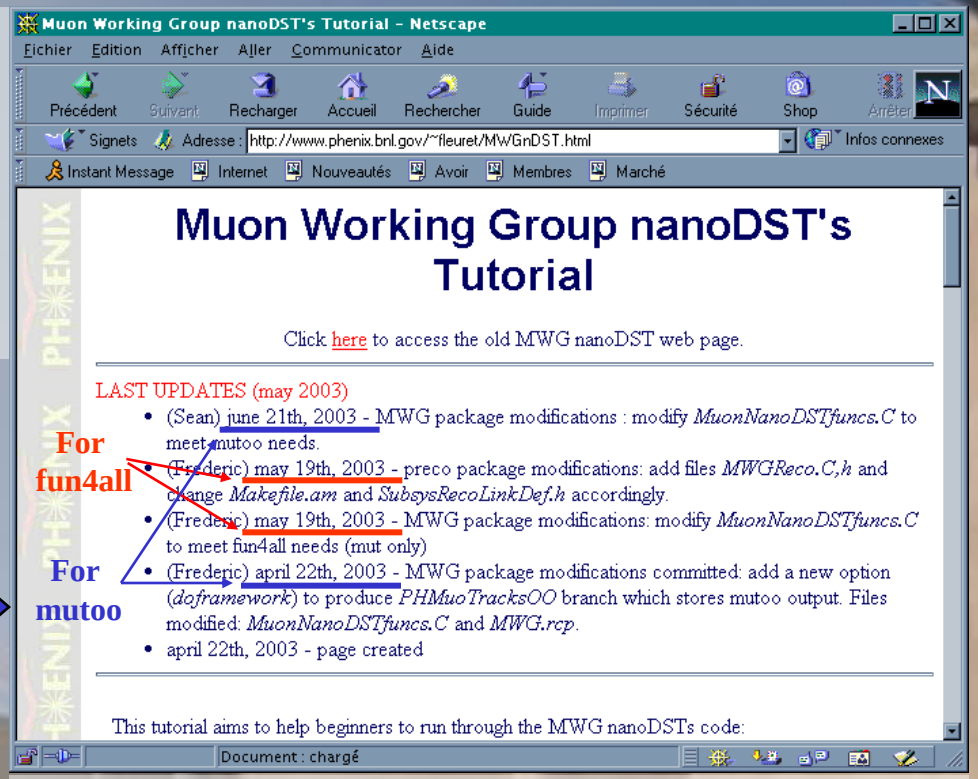
- **NanoDST scheme**
  - **2 Ttrees :**
    - **T1 → run information : 1 entry per selected run**
    - **T → event information : 1 entry per selected event**
      - **TrigLvl1 node**
      - **PHGlobal node : Zvertex, BBC, ZDC, run number, …**
      - **PHMuoTracks node : Muon (and dimuon) tracks information**

- **Guideline : Keep It Small & Simple**
  - **Add variables and information within one of the existing nodes**
  - **Don’t add node unless it’s necessary**

Analysis with nanoDSTs

- **Last improvements**
  - **Add a branch for mutoo (Chun & Sean)**
  - **Changes for fun4all (Vi-Nham & Fred)**
  - **Add Fcal (MVD?) info (Jane)**
  - **Add dMuiPseudoTrigger info (Hiroki)**
  - **Memory leak investigation (Jason)**





Fun4all troubles :

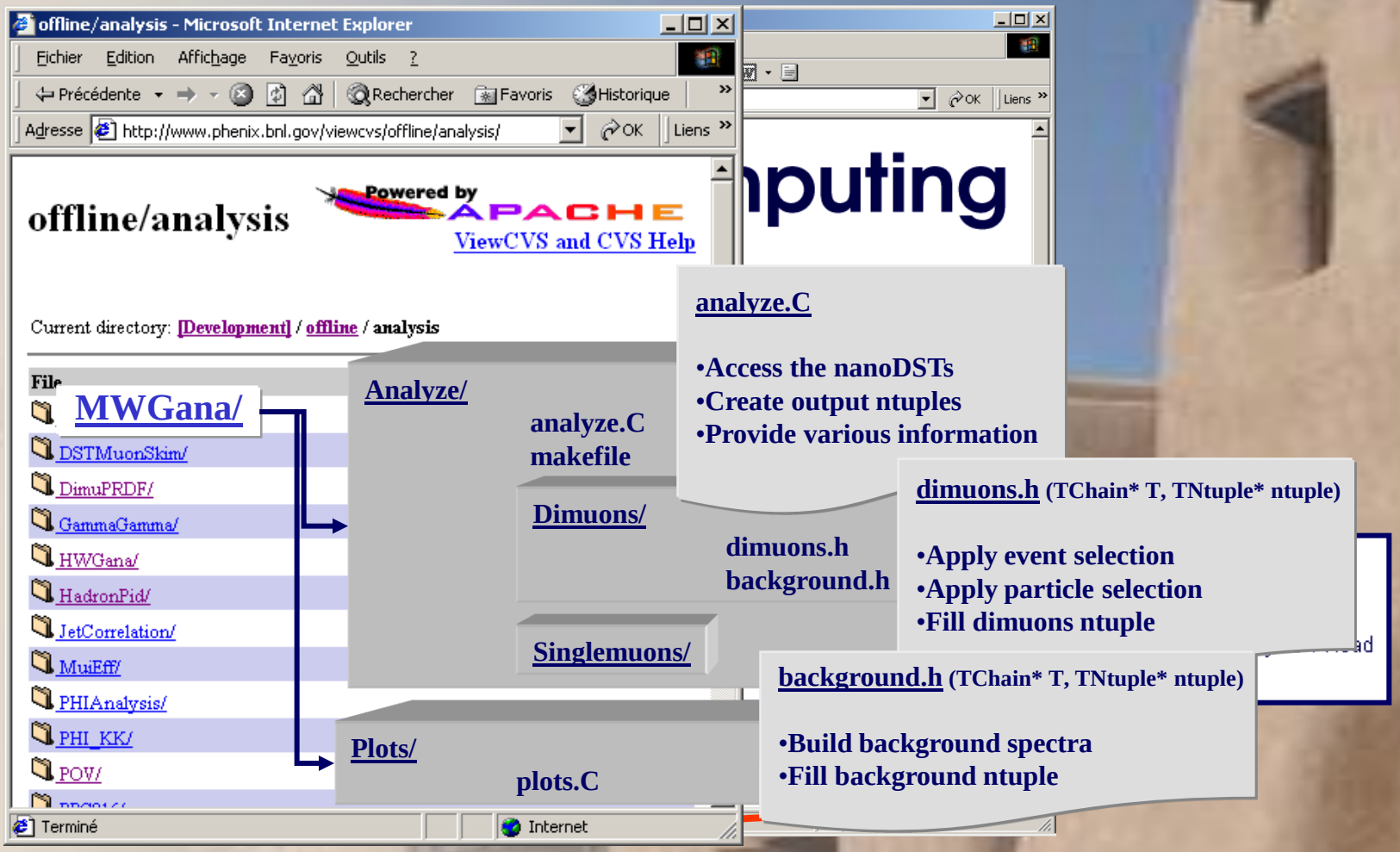
- **lost cuts on tracks**
- **no output track's cut information**

Analysis with nanoDSTs

- **Current analysis procedure**
  1. **<u>Produce nanoDSTs :</u> DSTs→ nanoDSTs (nanoDSTs size / DSTs size < 0.2 %)**
  2. **<u>Produce ntuple with analyze.C :</u>**
     - **A compiled macro.**
     - **Few minutes to go thru all nanoDSTs.**
     - **Output = a root ntuple.**
  3. **<u>Produce plots with plots.C :</u>**
     - **A root macro.**
     - **Less than a minute to go thru data.**
     - **No specific library to be loaded.**

MWGana

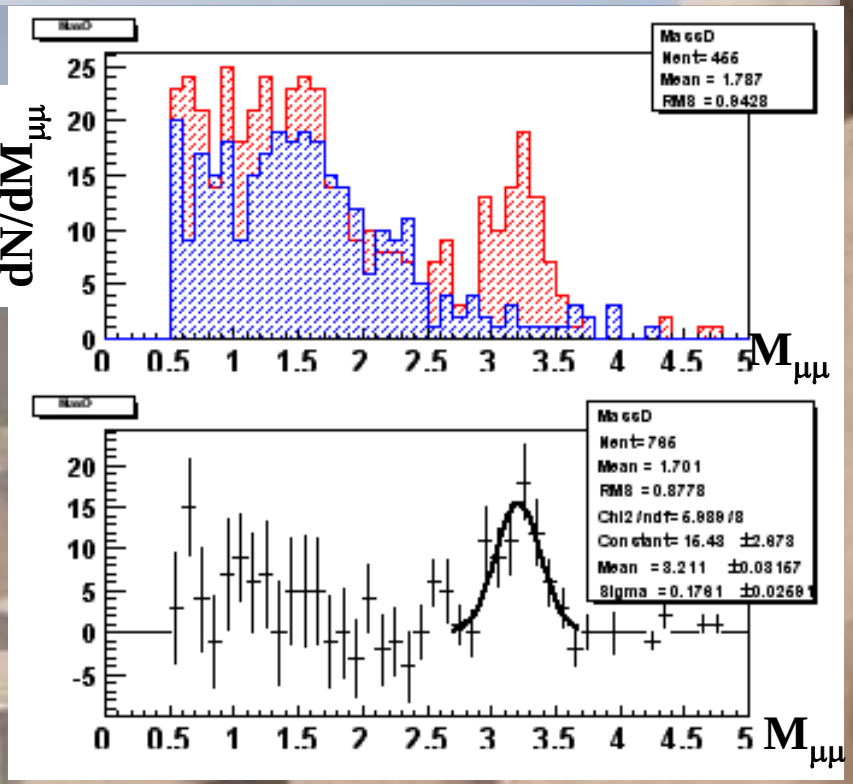
- **Analysis framework proposal**
  - **« CVSify » the analysis code**



Background estimation

- **Study of the Background coming from π‘s (main source) and K's decays.**
  - **<u>So far :</u>** $N_{signal} = N^{+-} - (N^{++} + N^{--})$

<u>Goal :</u> Use *single* μ events to estimate the background



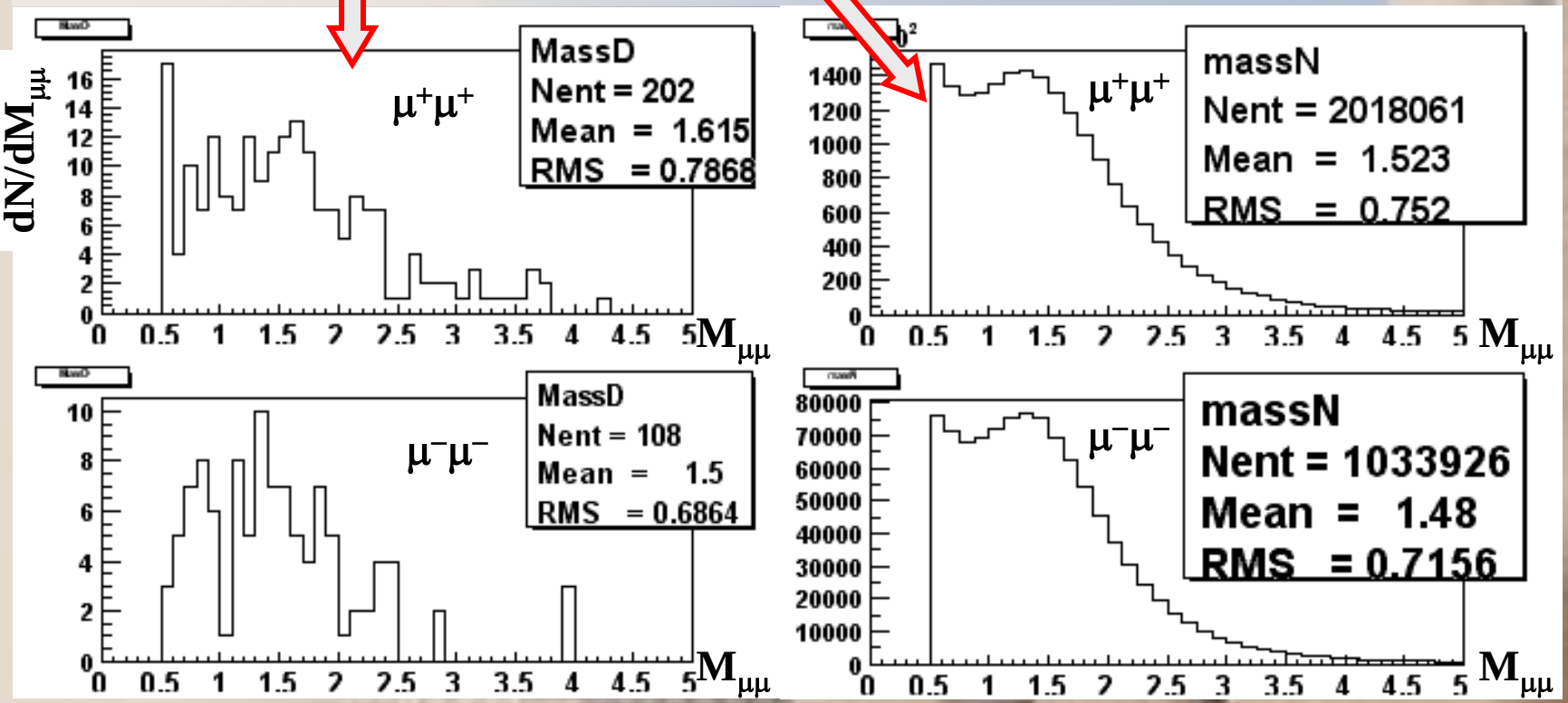
A new background estimation

- **Material : Real data**
  - ***Sample : pp 2002***
    - **Event Selection :**
      - **2 μ trigger (1 *deep* + 1 *shallow*)**
      - **$|Z_{BBC}| < 38$ cm**
  - ***Statistics :***
    - **Events w/ at least 2 tracks : 455 $\mu^+\mu^-$ / 202 $\mu^+\mu^+$ / 108 $\mu^-\mu^-$**
    - **Events w/ 1 track only : 25658 *single* μ^+ / 17782 *single* μ^-**
  - ***Create fake dimuons samples :***
    - **Pick randomly 10000 single μ events from the 43440 single μ events sample**
    - **Create combinatorial dimuons from these 10000 single μ events, with $|Z_{BBC1} - Z_{BBC2}| < 5$cm**

$\rightarrow$ ~ 6 M 2μ

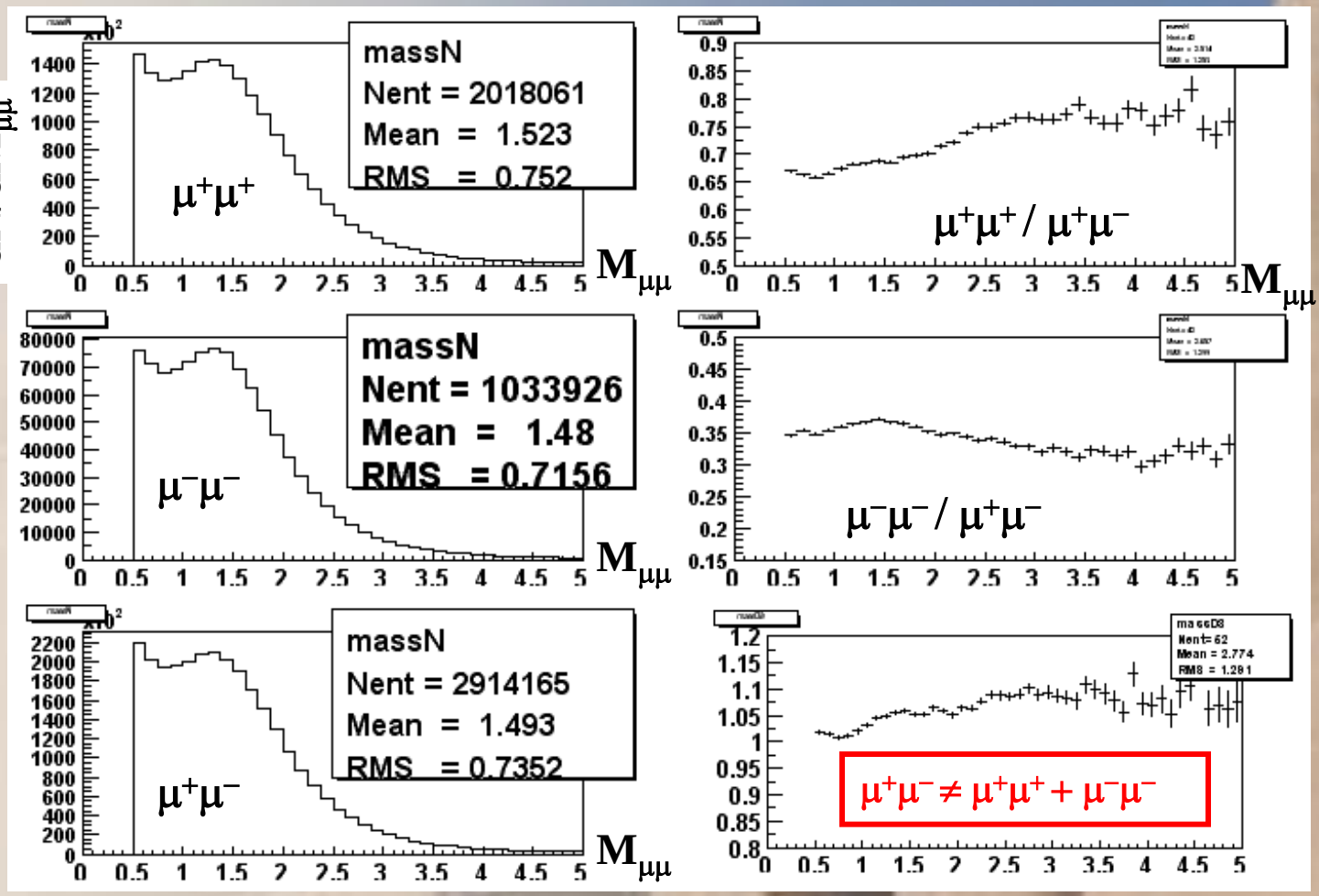
A new background estimation

- **Likesign dimuons**
  - **Mass spectra**
    - **true dimuons : $N^{++}/N^{--} = 1.87 \quad 0.31$**
    - **fake dimuons : $N^{++}/N^{--} = 1.952 \quad 0.003$**



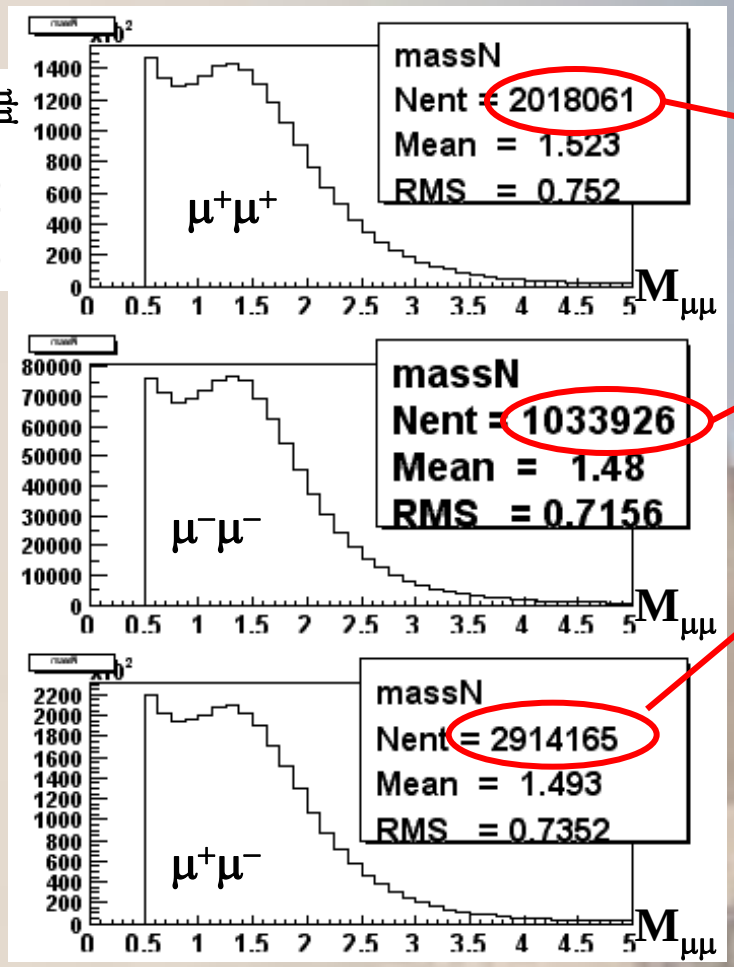
A new background estimation

- **Fake dimuons**
  - **Spectra's shapes**



A new background estimation

- **Fake dimuons**
  - **Opposite signs .vs. Like signs**



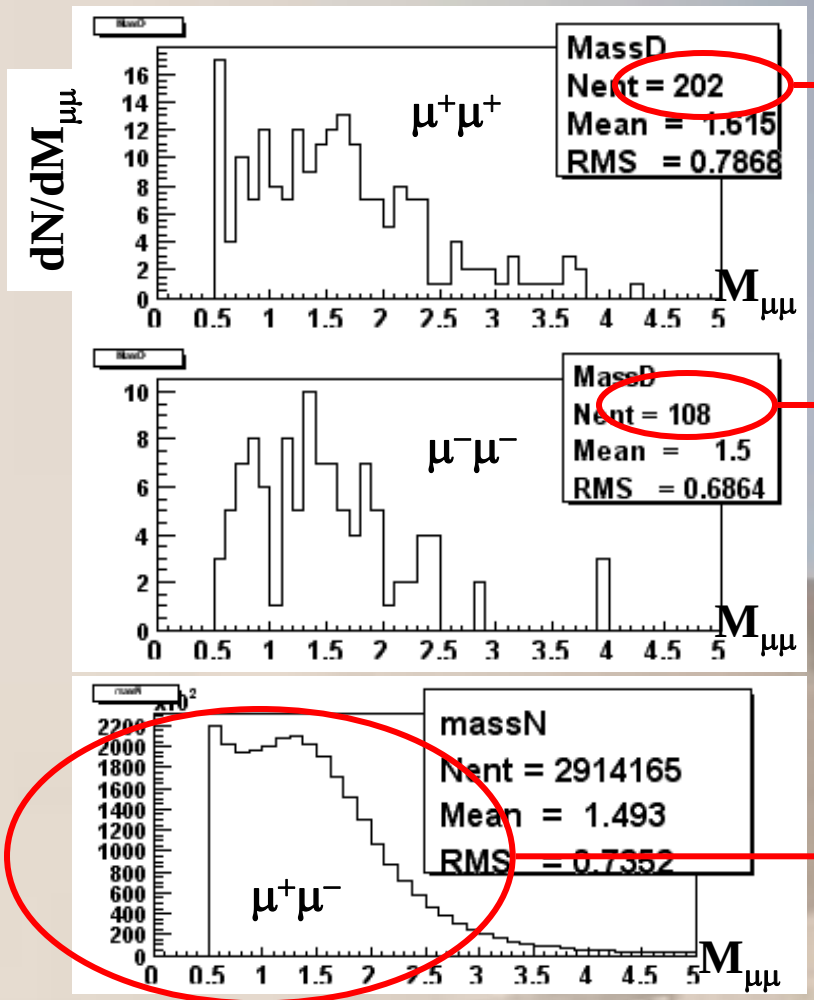
Fake dimuons :

N^{++}, N^{--}, N^{+-} known

$$N^{+-} = 0.955 \times (N^{++} + N^{--})$$

A new background estimation

- **Normalisation with true dimuons**



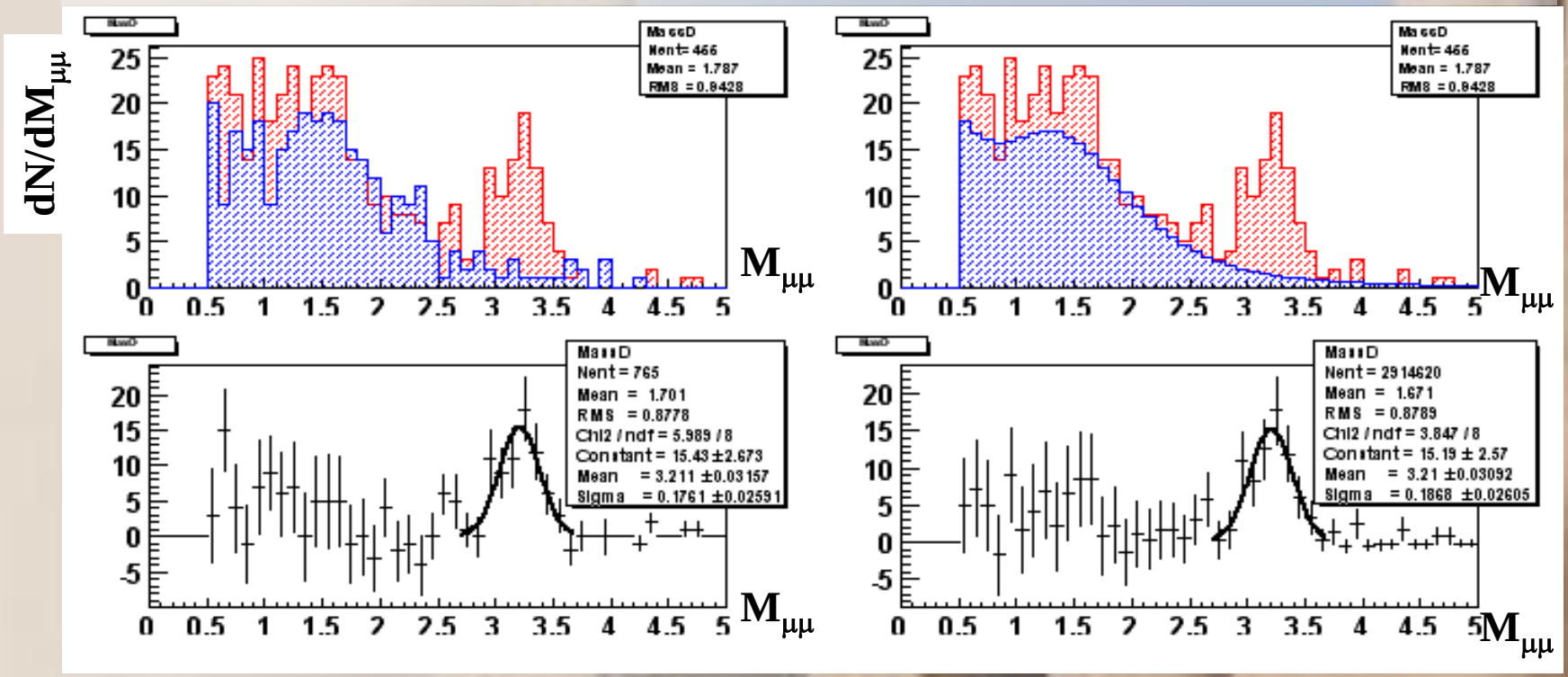
$$N^{+-} = 0.955 \times (N^{++} + N^{--})$$

$$= 0.955 \times (202 + 108) = 296.05$$

Use numbers of **true** $\mu^+\mu^+$ and **true** $\mu^-\mu^-$ to normalize the **fake** $\mu^+\mu^-$ spectrum

A new background estimation

- **Bkg's shape : $\mu^+\mu^- \neq \mu^+\mu^+ + \mu^-\mu^-$**
- **Bkg's integral : $N^{+-} = 0.955 \times (N^{++}+N^{--})$**
- **Use of fake dimuons spectrum**
- **Normalisation with true likesign dimuons**



Analysis with nanoDSTs : summary

- **Making nanoDSTs**
  - ***in progress…***
- **Analyzing nanoDSTs**
  - **CVSify the code : comments, suggestions ?**
  - **A new macro for background estimation :**

    to be included in MWGana…

Background estimation

- ***single*** **μ**
  - **Momentum's spectra**