The simulation of the van der Meer scan

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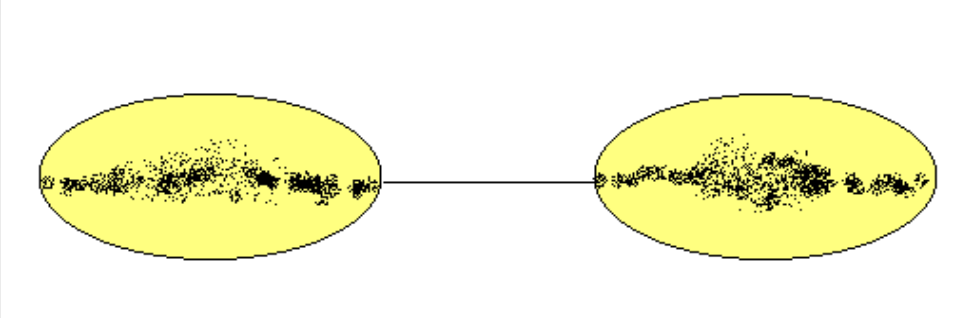
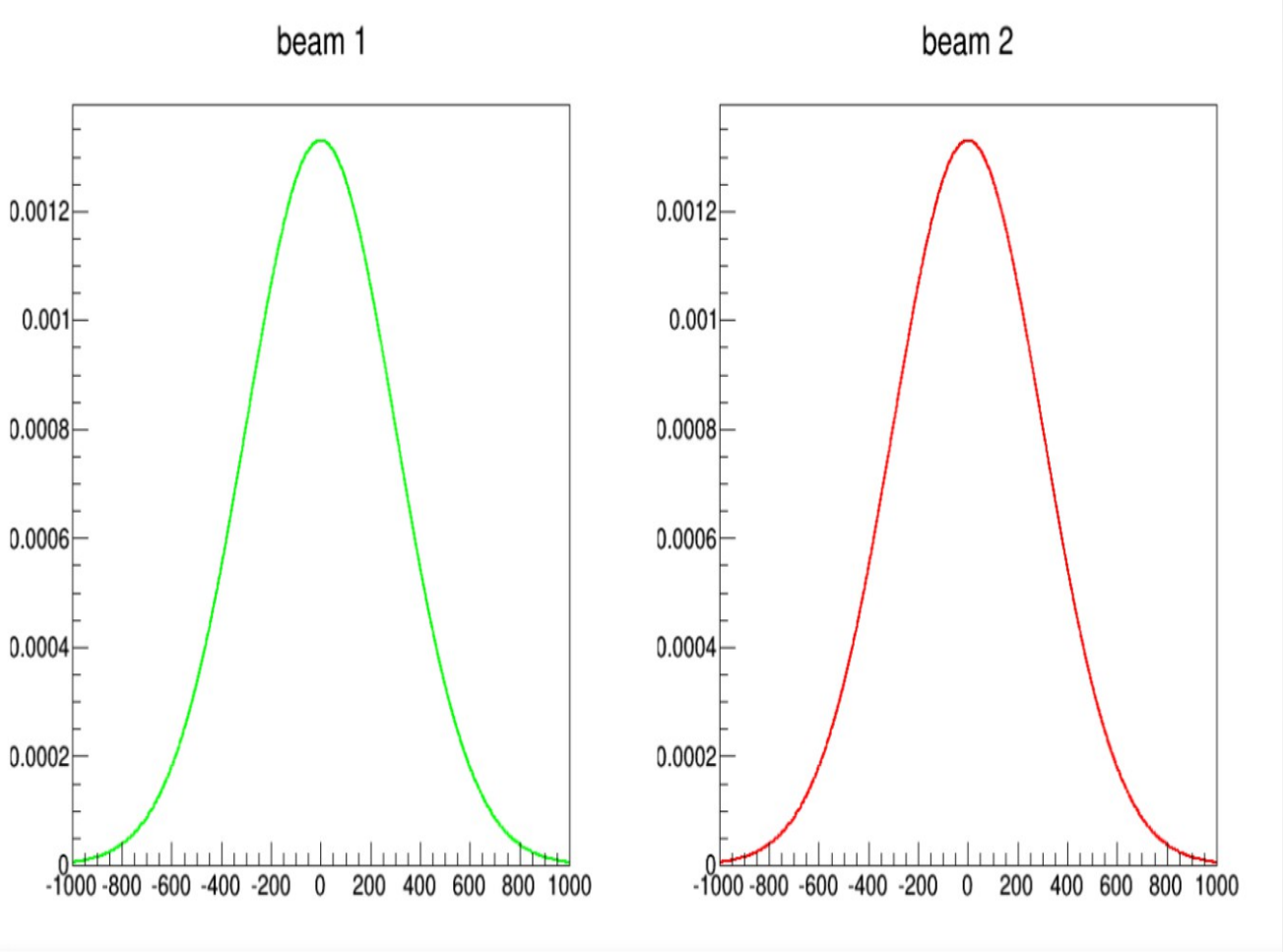
1.1 introduction



$$F(x) = \frac{1}{\sqrt{(2\cdot\pi)}\cdot\sigma} e^{\left(\frac{-\left(\left(\frac{1}{2}\right)(x-\mu)^2\right)}{2\cdot\sigma^2}\right)}$$

$$F(\mu) = \int \left(\frac{1}{\sqrt{(2\cdot\pi)}\cdot\sigma} e^{\left(\frac{-\left(\left(\frac{1}{2}\right)(x)^2\right)}{2\cdot\sigma^2}\right)}\right)\cdot\left(\frac{1}{\sqrt{(2\cdot\pi)}\cdot\sigma} e^{\left(\frac{-\left(\left(\frac{1}{2}\right)(x-\mu)^2\right)}{2\cdot\sigma^2}\right)}\right) dx$$

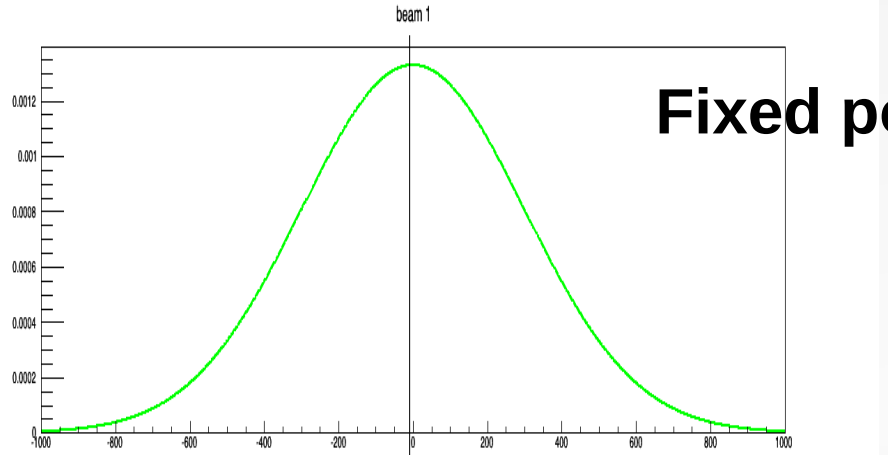
1.2 Beams profiles

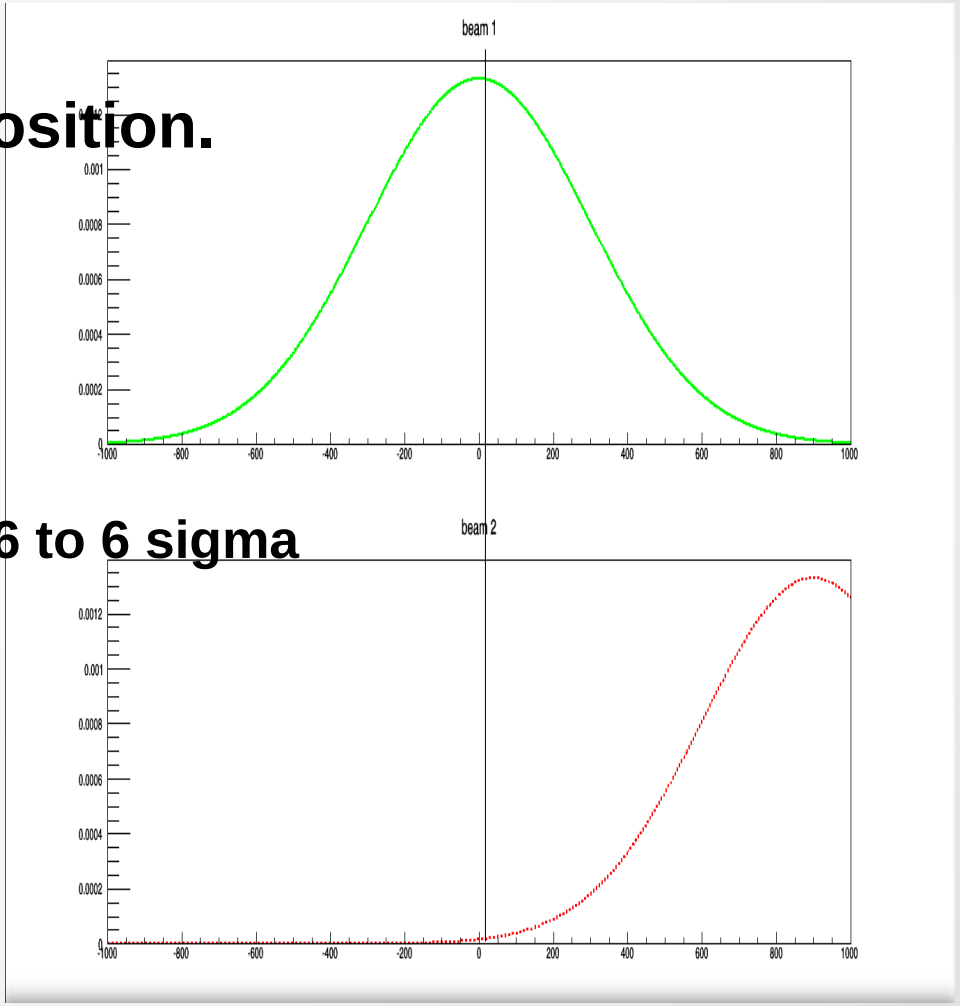


- Beams defined as gaussian functions with the parameters

  σ and μ

1.3 integration

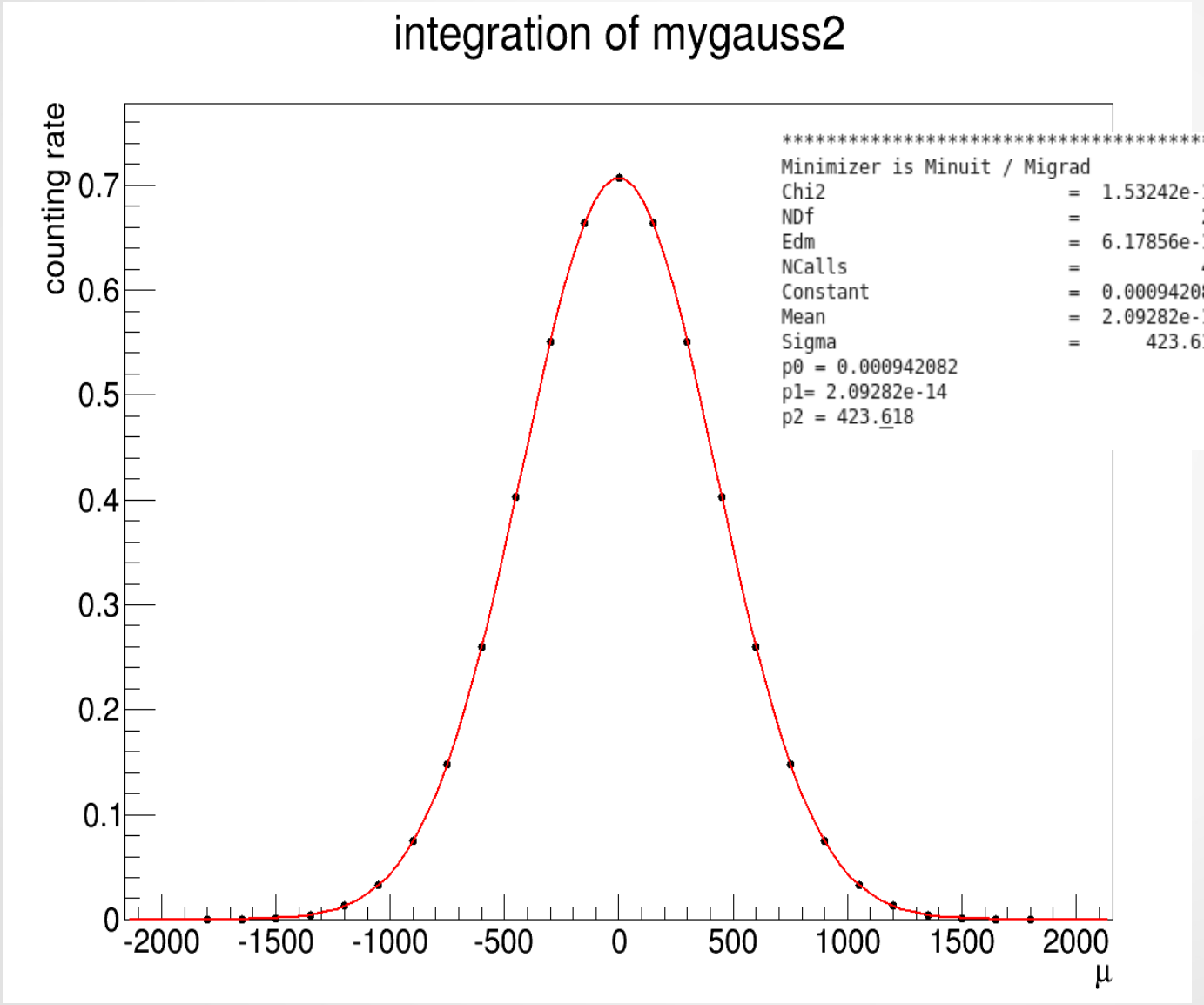




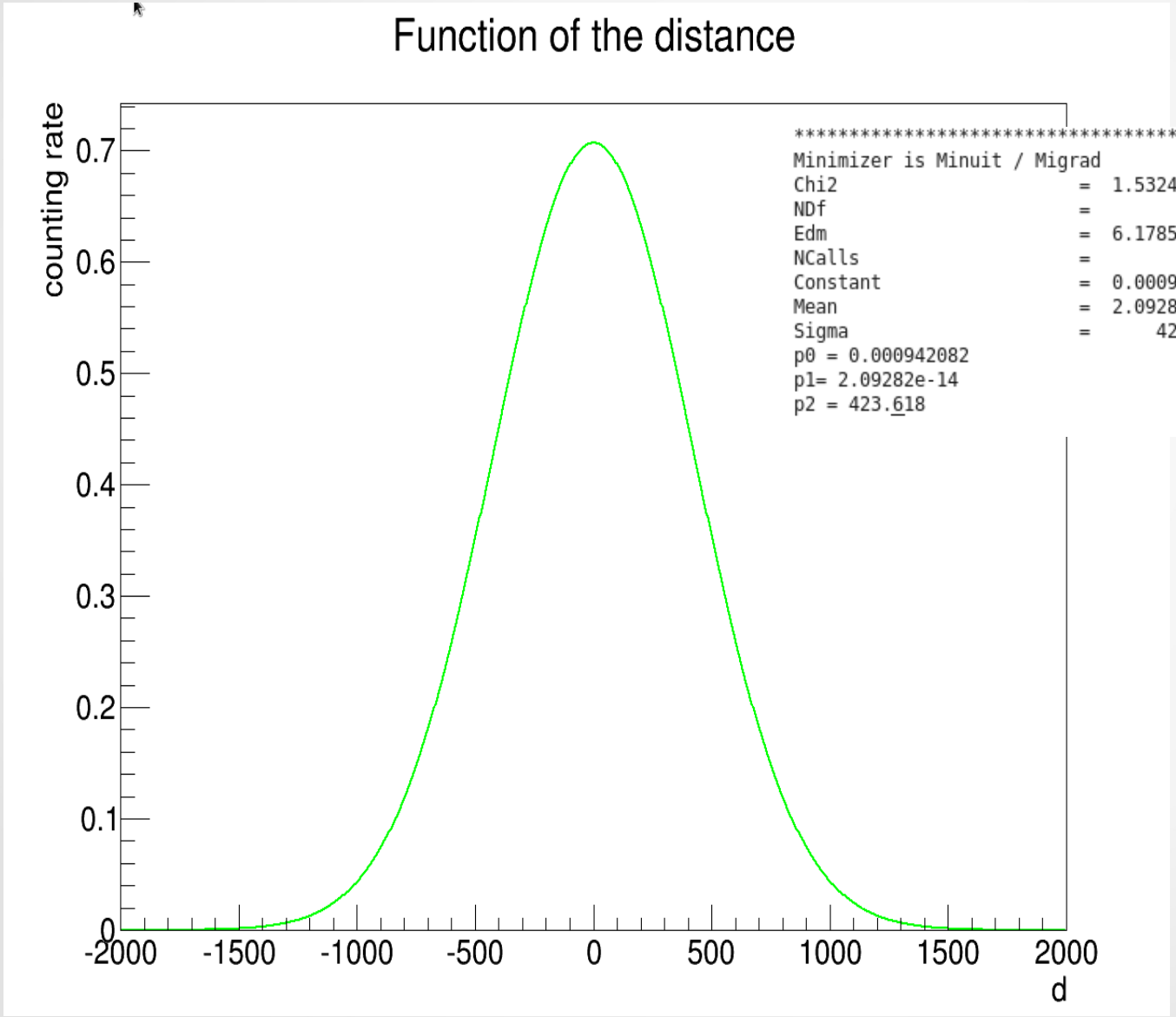
Fixed position.

Move from -6 to 6 sigma

1.4 Result of the simulation



1.5 second result of the simulation

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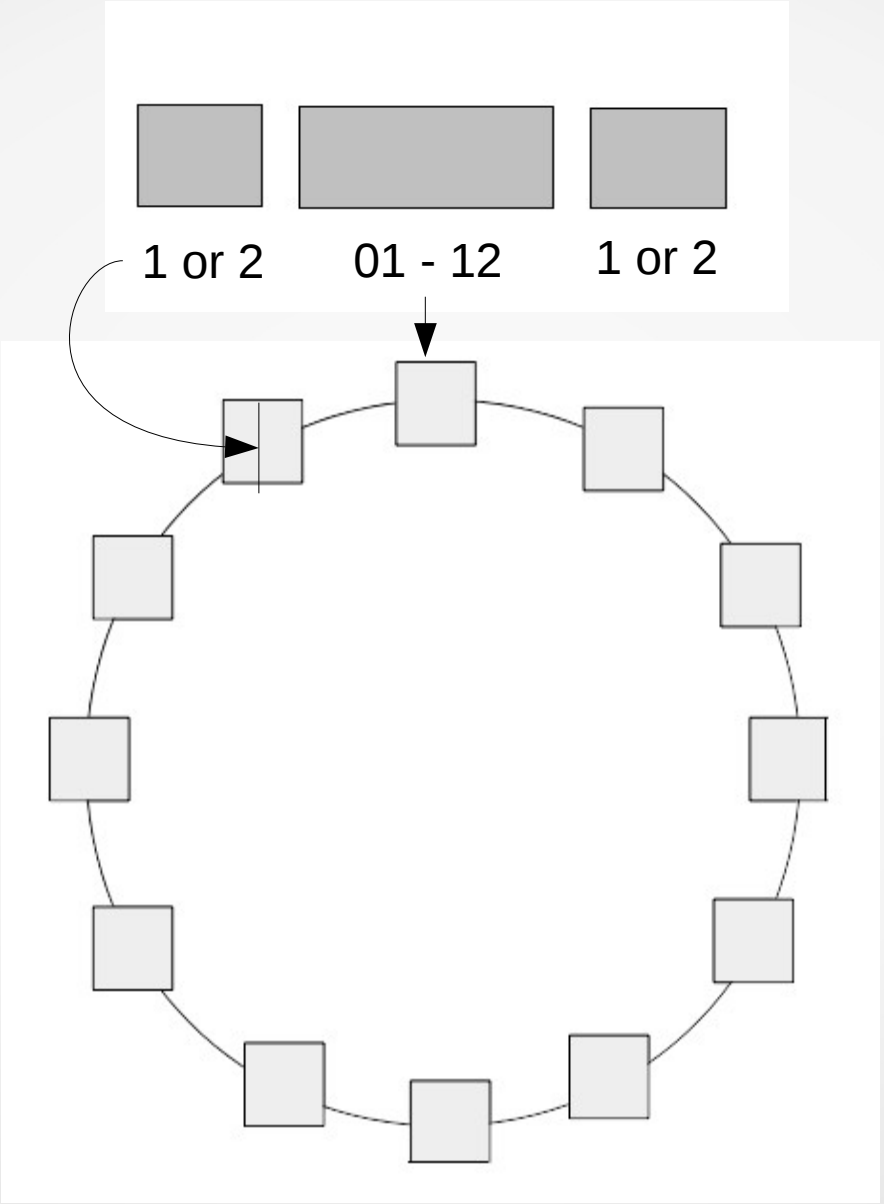
****************************************
Minimizer is Minuit / Migrad
Chi2                      =  1.53242e-11
NDf                       =           22
Edm                       =  6.17856e-11
NCalls                    =           49
Constant                  =  0.000942082   +/-   7.62332e-07
Mean                      =  2.09282e-14   +/-   0.237508
Sigma                     =      423.618   +/-   0.00189704      (limited)
p0 = 0.000942082
p1= 2.09282e-14
p2 = 423.618
```

1.6 simulation events



1.7 Simulation events