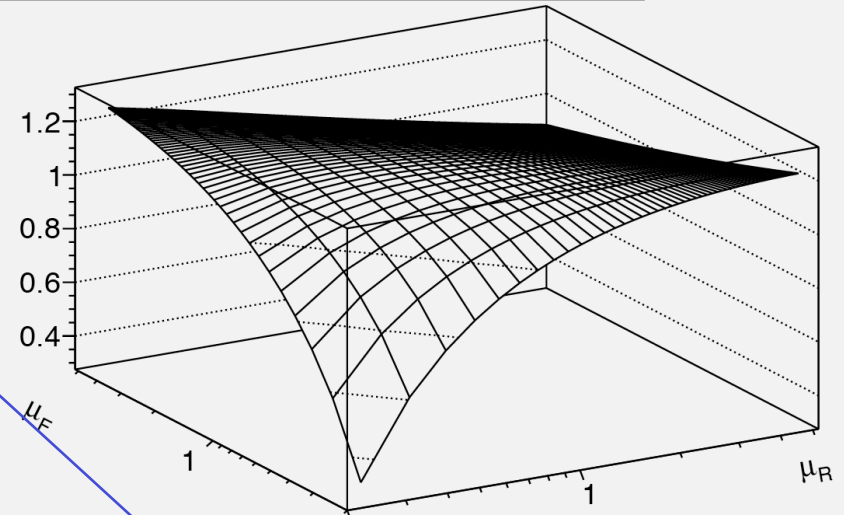


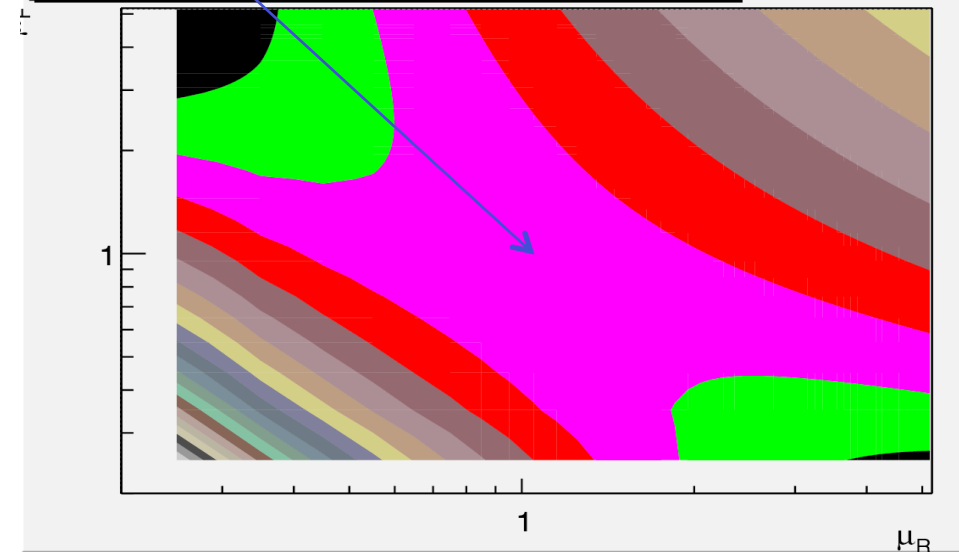
# Now look at the dijet mass cross section

- In most cases, get a nice saddle region around  $p_T^{\text{jet}}$

Scale dependence.  $0.0 < |y| < 0.3$ .  $2780 < m_{jj} [\text{GeV}] < 3040$



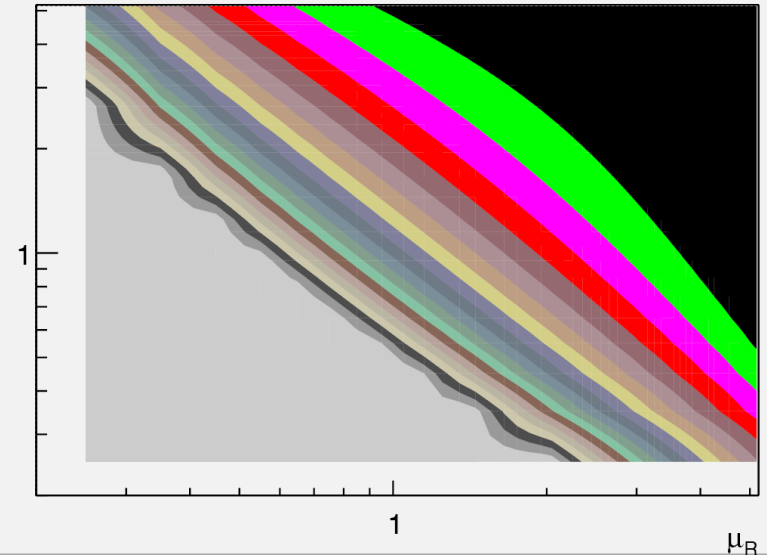
Scale dependence.  $0.0 < |y| < 0.3$ .  $2780 < m_{jj} [\text{GeV}] < 3040$



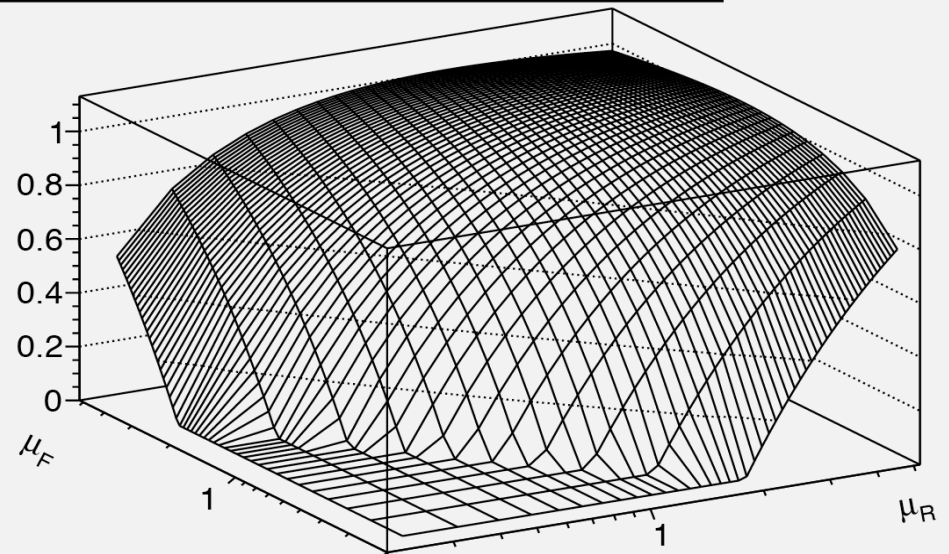
# ...but not for forward rapidities

- Is perturbation theory not valid here?
- It's ok as long as *reasonable scales* are chosen
- It's a continuation of the effect that we've been looking at
- NB:  $y^*$  seems to be worse than  $y_{\max}$

Scale dependence.  $2.1 < |y| < 2.8$ .  $3310 < m_{jj} [\text{GeV}] < 3610$



Scale dependence.  $2.1 < |y| < 2.8$ .  $3310 < m_{jj} [\text{GeV}] < 3610$



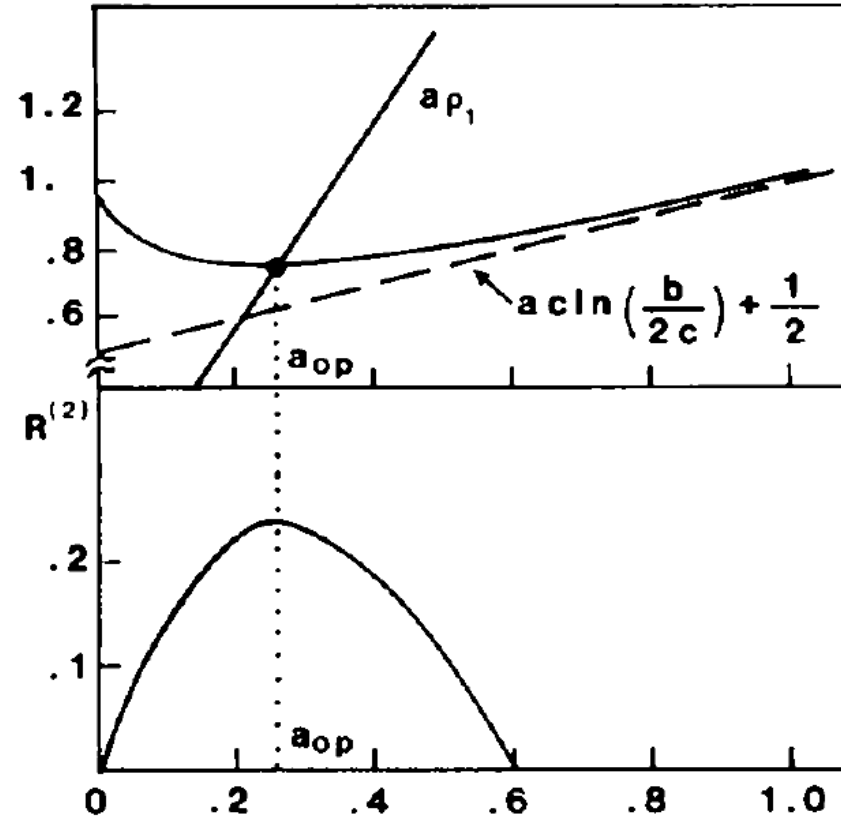
# Looking for saddle points

- Can find saddle point analytically by solving a transcendental equation

$$\tau + \frac{1}{2} \frac{c}{1+ca} = \rho_1$$

- ...where  $\rho_1$  is a dimensionless form of the jet cross section, and  $\tau$  depends on the scale  $\mu$  and on  $\Lambda$
- But can also use a python script

*P. Aurenche et al. / Higher order QCD prediction*



tion of Stevenson's equation for  $a_{op}$ ; (b) plot of the function  $R^{(2)}$  as a function of  $a$ .

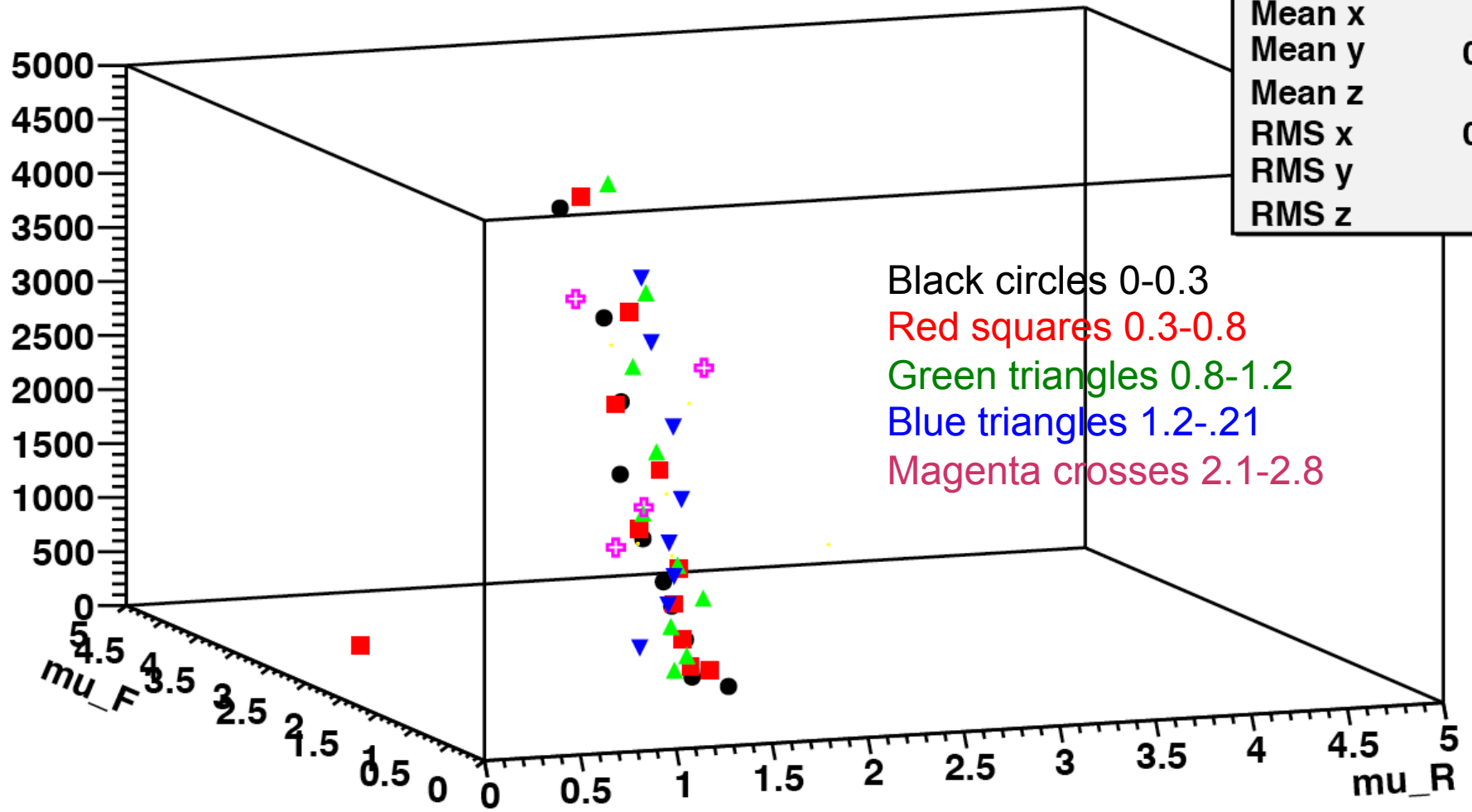
# Dijet cross section ( $R=0.4, y^*$ )

3D histogram

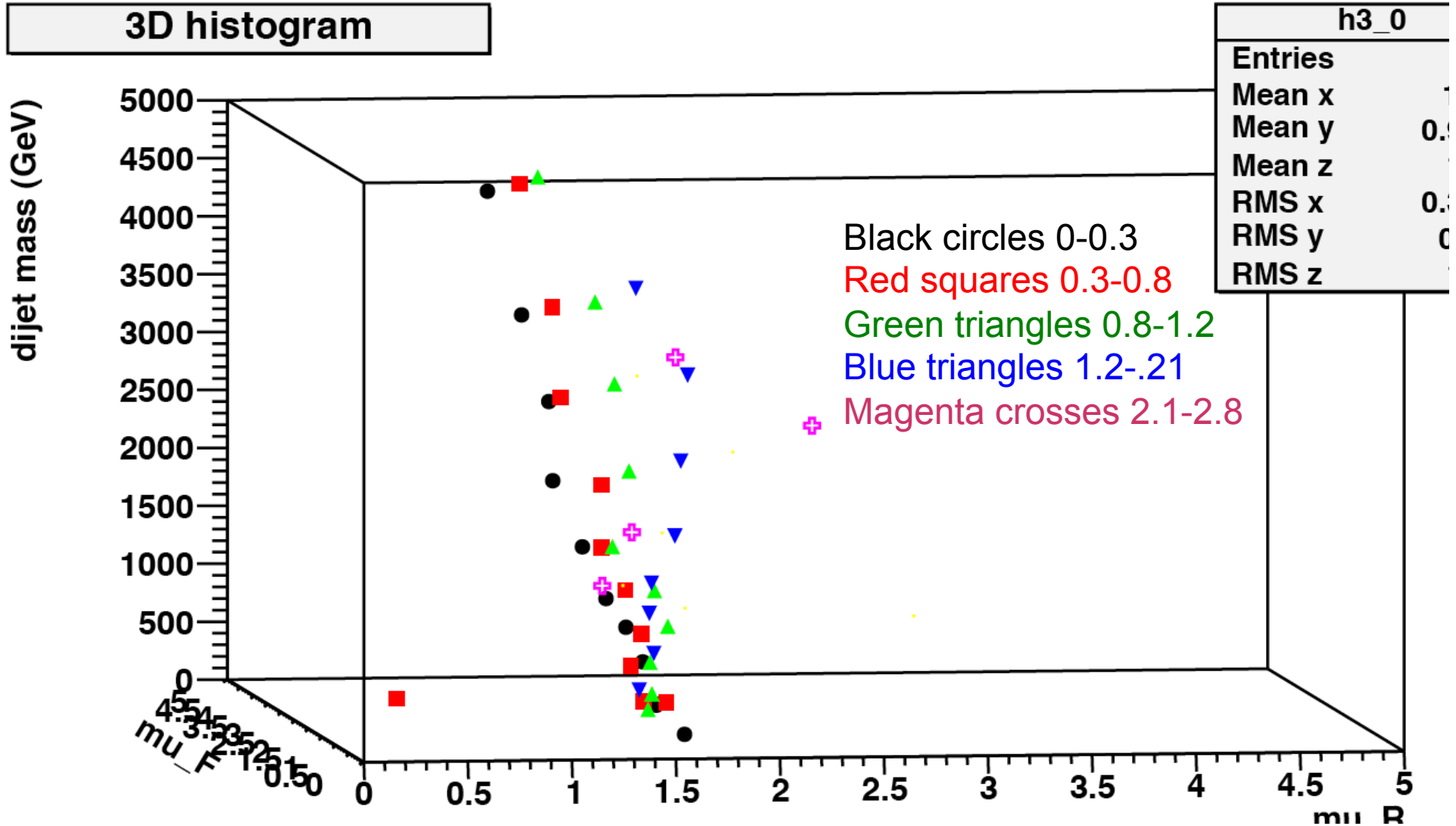
Position of saddle point

h3\_0

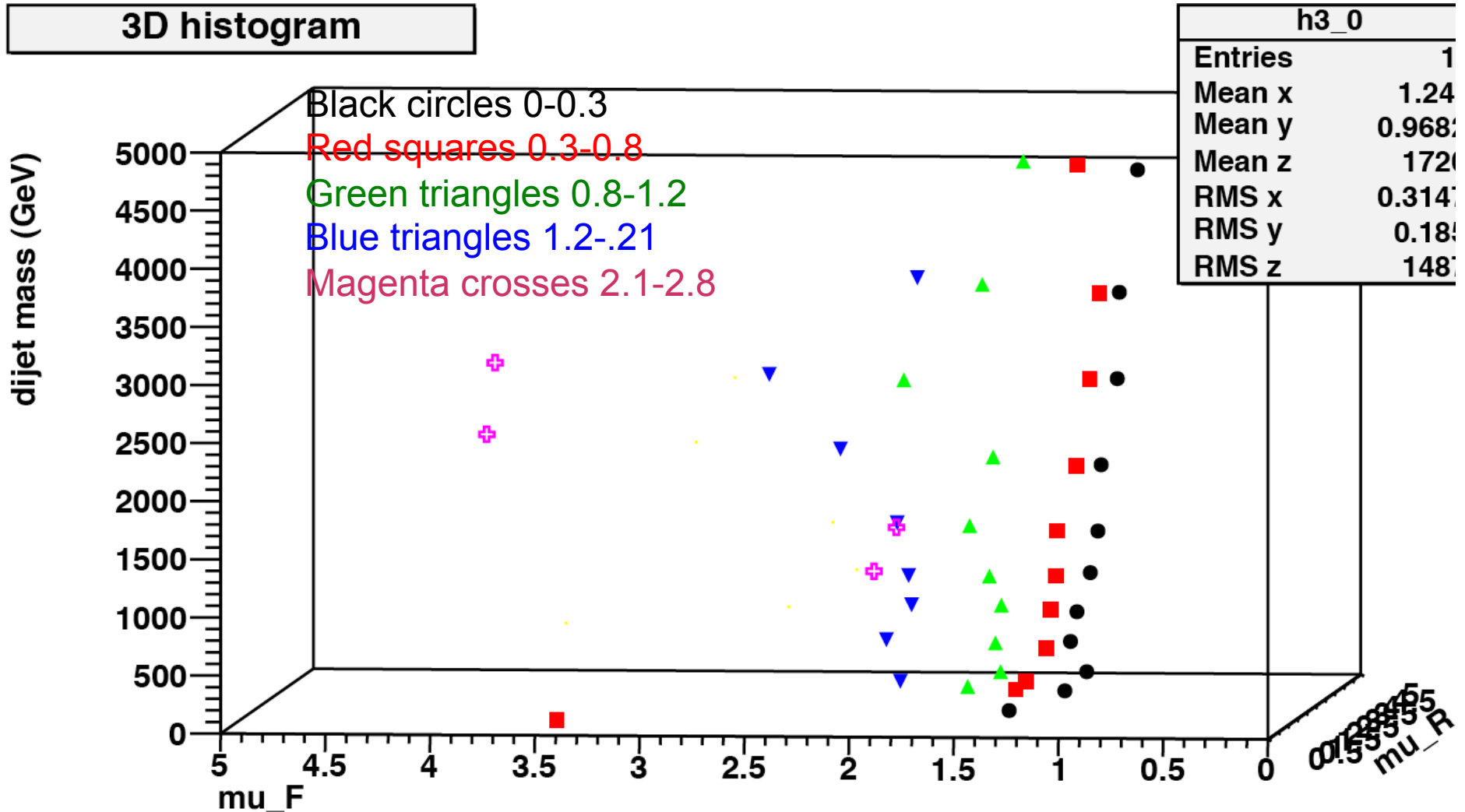
Entries	
Mean x	1.
Mean y	0.9
Mean z	1
RMS x	0.3
RMS y	0.
RMS z	1.



$\mu_R$  increases with  $y^*$



# $\mu_F$ increases with $y^*$



Note: maybe no true saddle points at high  $y^*$  and high mass, so script has trouble finding them; there are still flat places