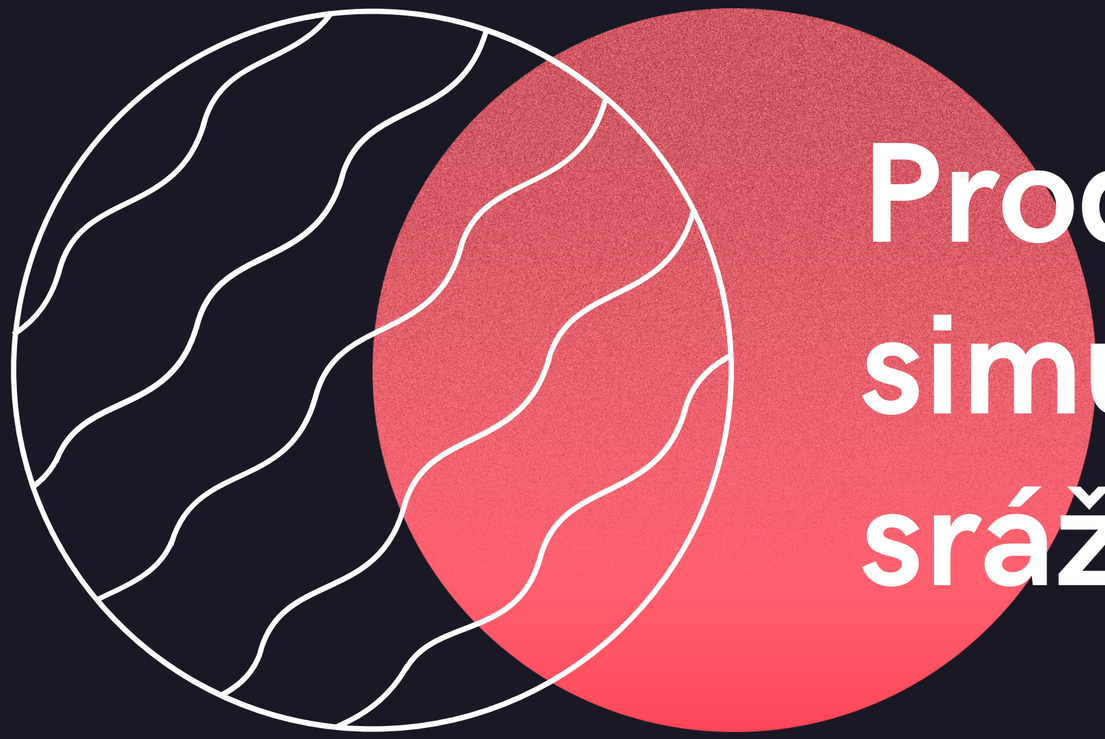
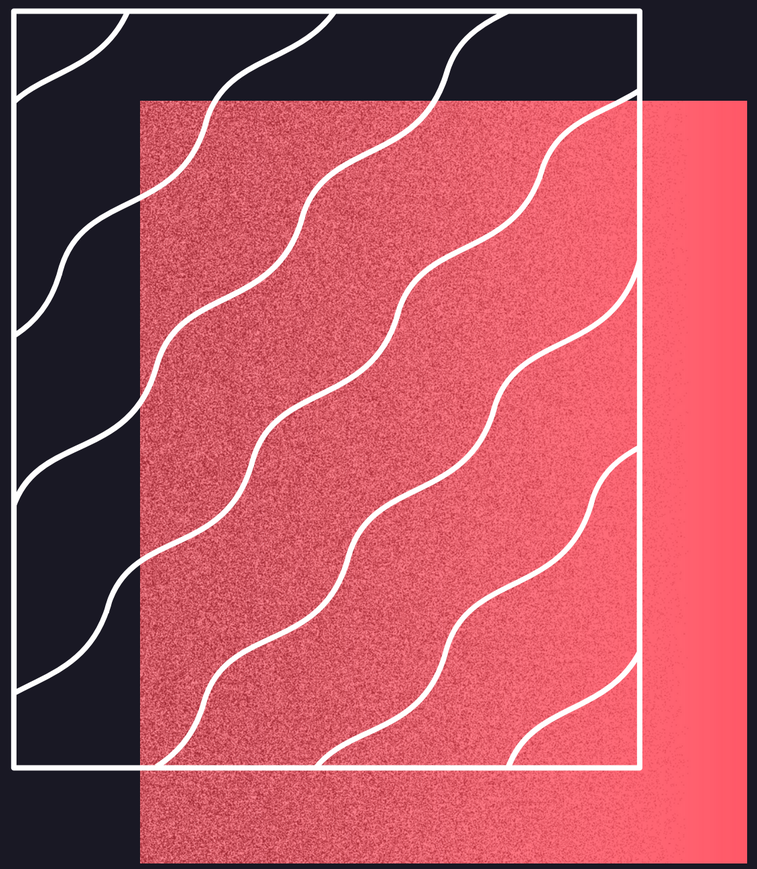


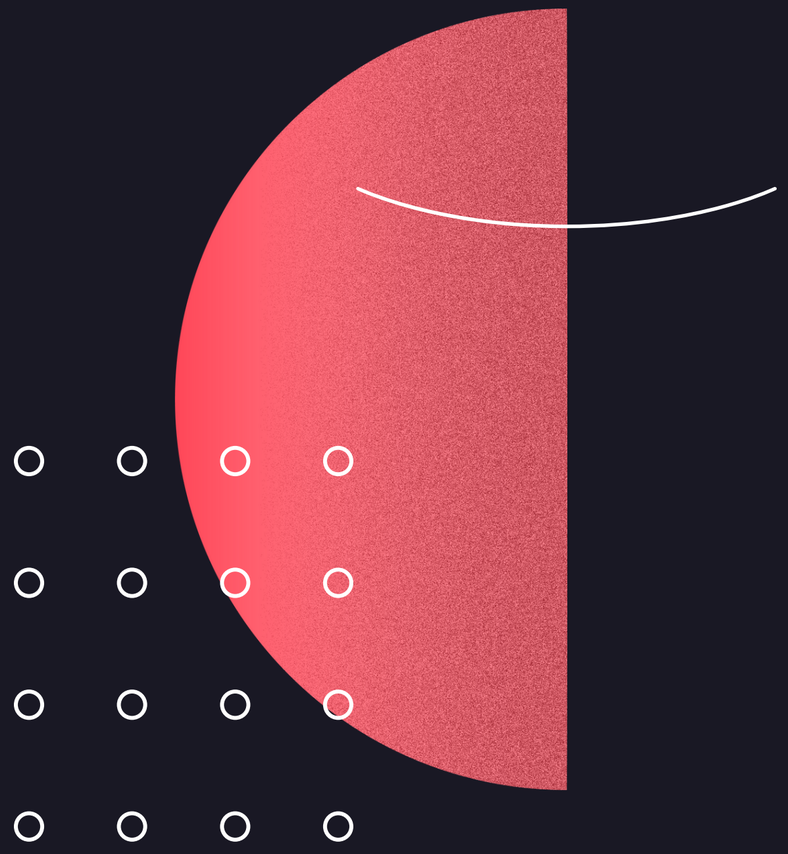
Produkce Z bosonu v simulovaných p+p srážkách

Adam Blažek, Dan Káčerek, Hugo Korcina, Jan Sova



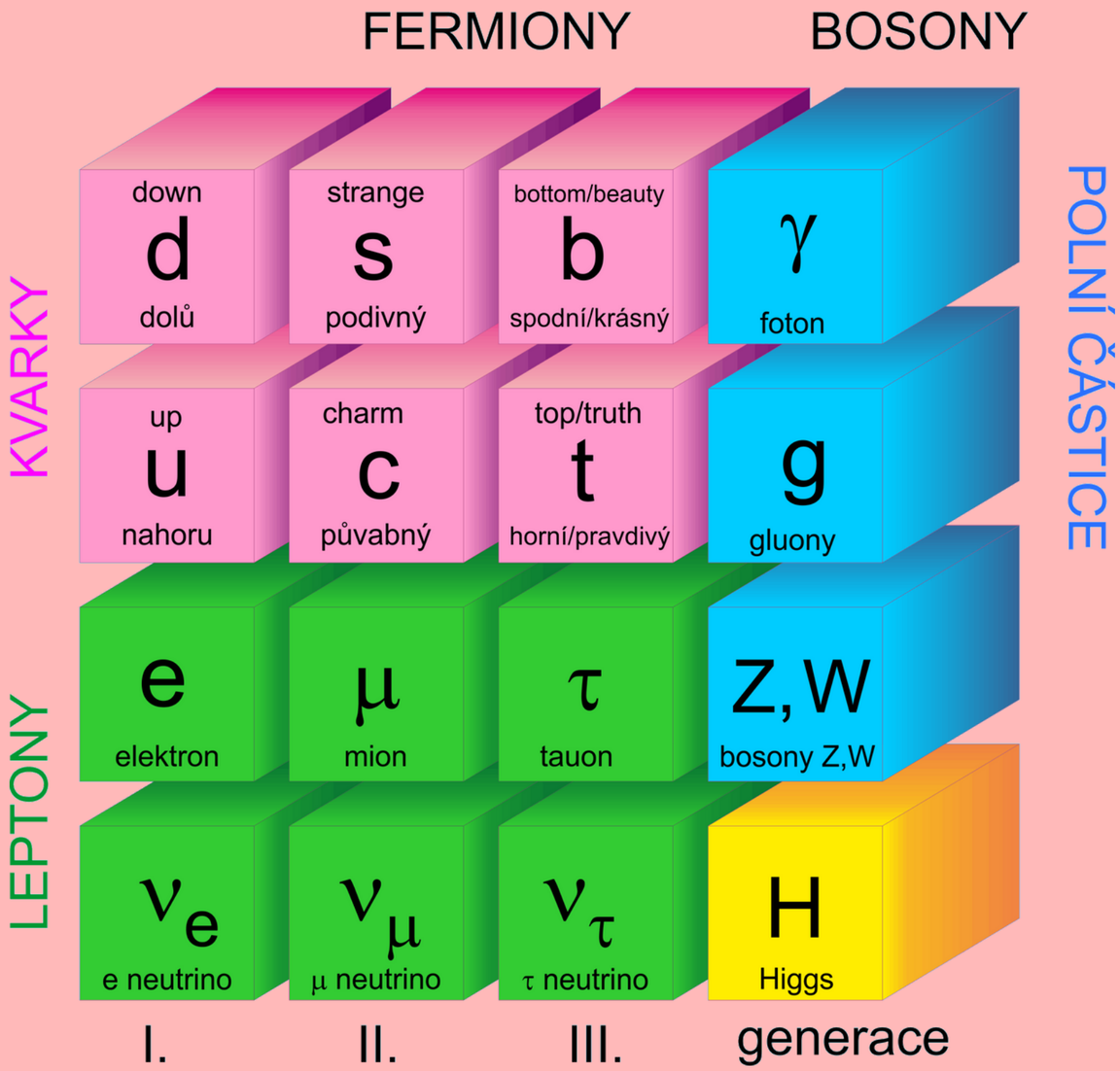
Slabá interakce

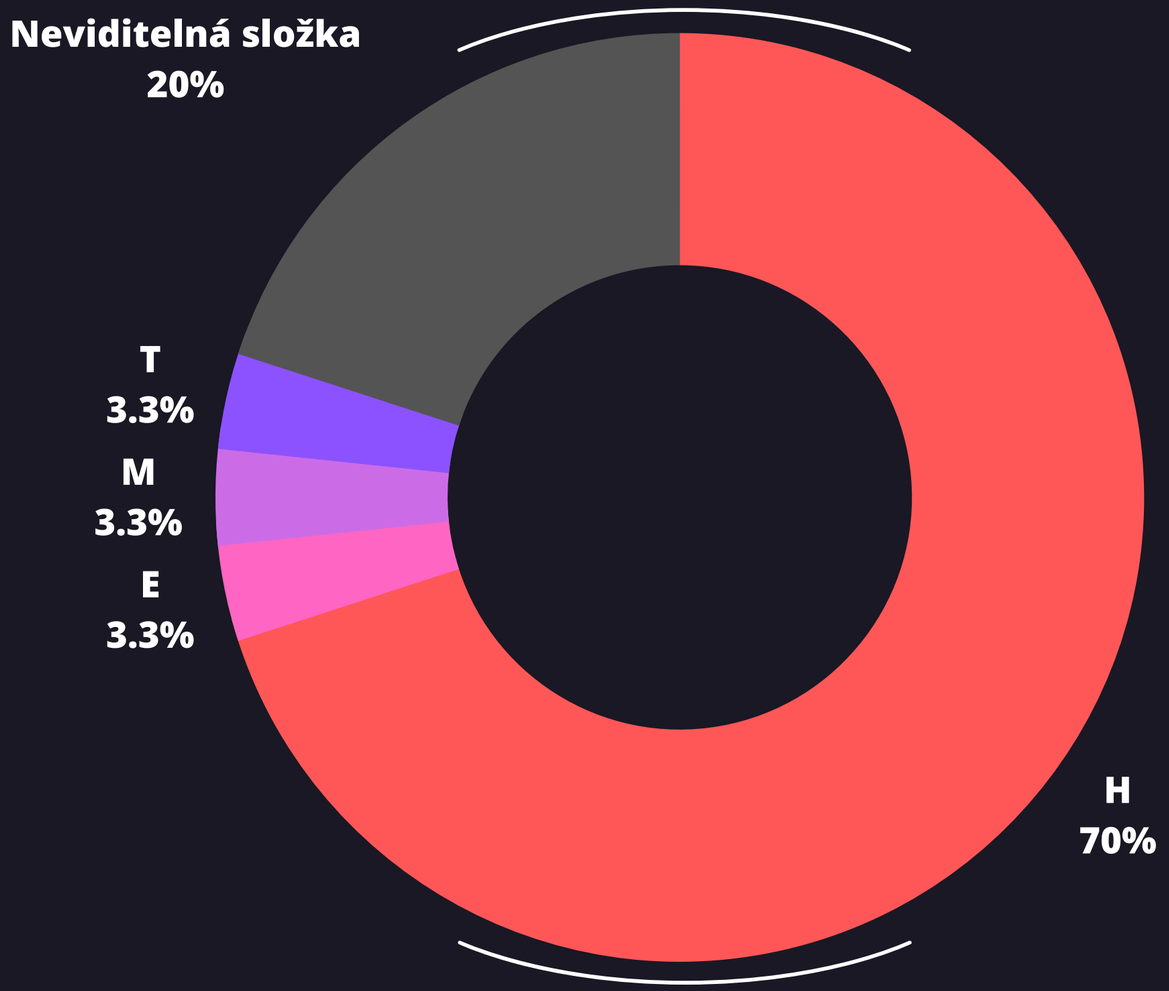
Slabá interakce je jedna ze čtyř elementárních sil, její dosah je 10^ -17 m. Působí na všechny levotočivé leptony. Je přenášena bosony W a Z. Typickým příkladem slabé interakce je beta rozpad.



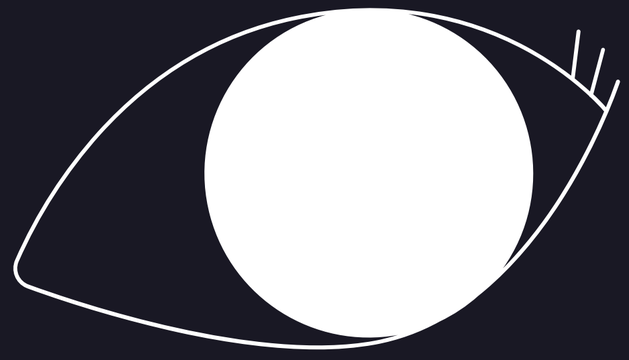
Co je to Z boson?

- Částice bez náboje
- m = 91 GeV
- Boson
- Předpověděn Weinbergem, Glashowem a Salamem
- Střední doba existence cca 10^-25 s


FERMIONY
BOSONY
KVARKY
LEPTONY
POLNÍ ČÁSTICE
down
d
dolů
strange
s
podivný
bottom/beauty
b
spodní/krásný
γ
foton
up
u
nahoru
charm
c
půvabný
top/truth
t
horní/pravdivý
g
gluony
e
elektron
μ
mion
τ
tauon
Z,W
bosony Z,W
νe
e neutrino
νμ
μ neutrino
ντ
τ neutrino
H
Higgs
I.
II.
III.
generace



Rozpad Z bosonu

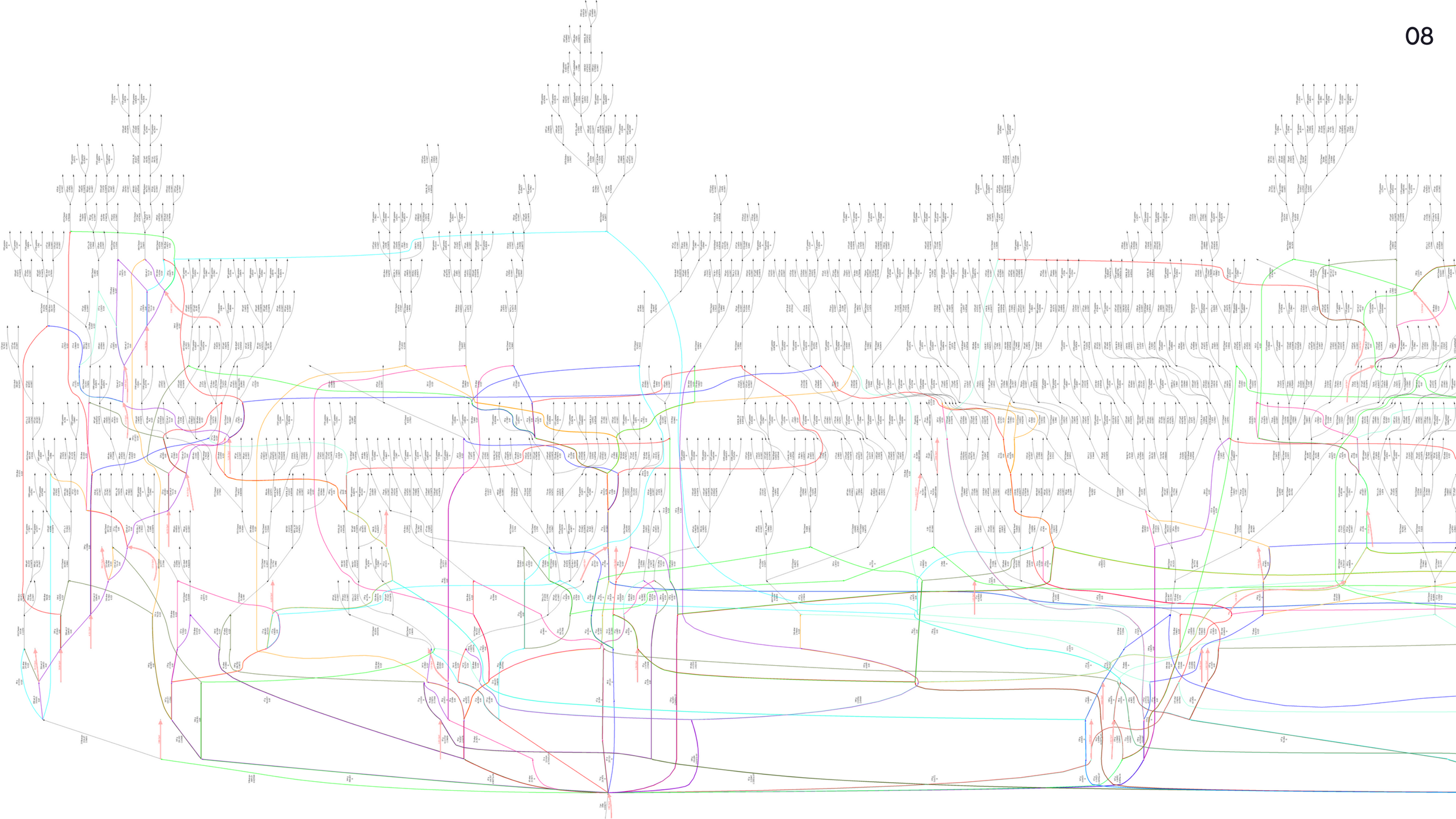


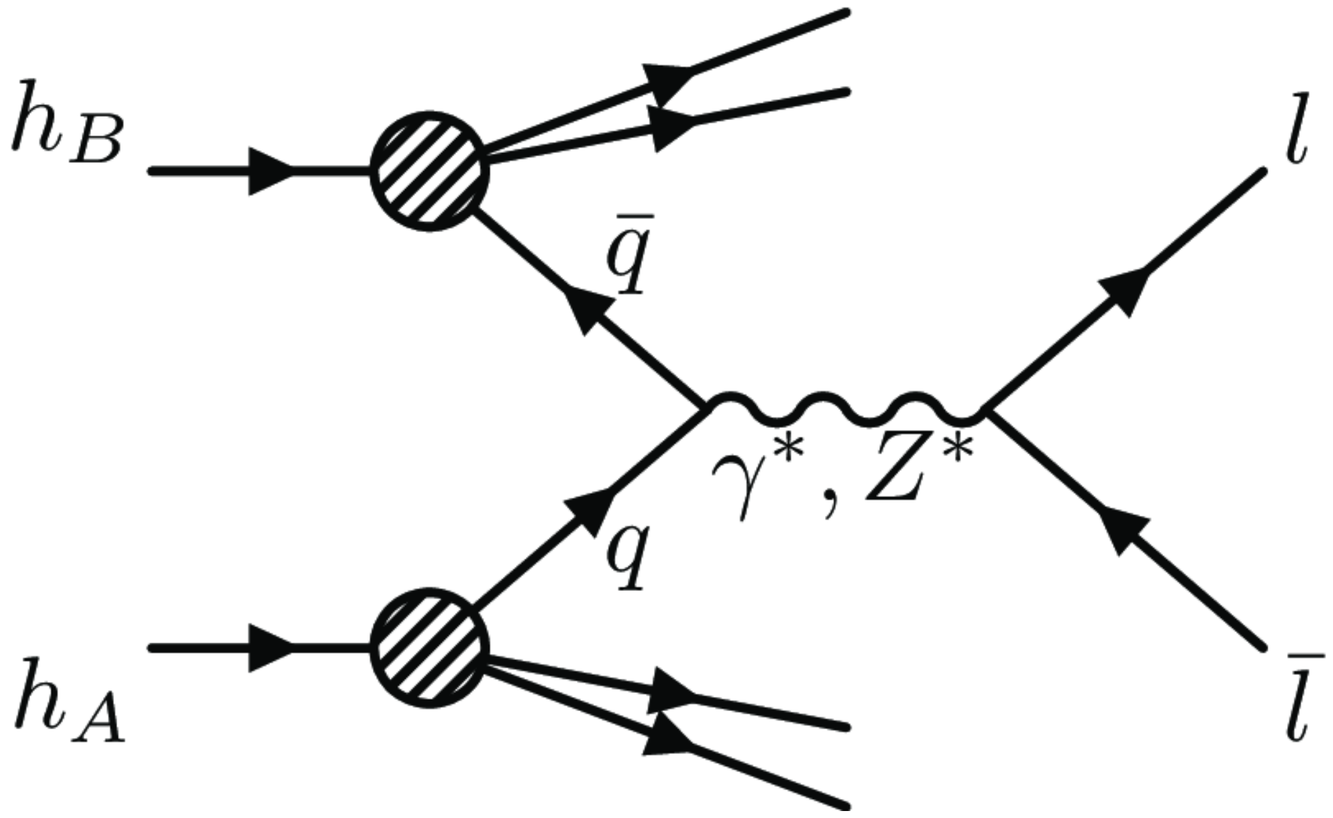
EXPERIMENTÁLNÍ ČÁST

Simulace srážek

- Probíhá na serveru FJFI na programu Herwig -->

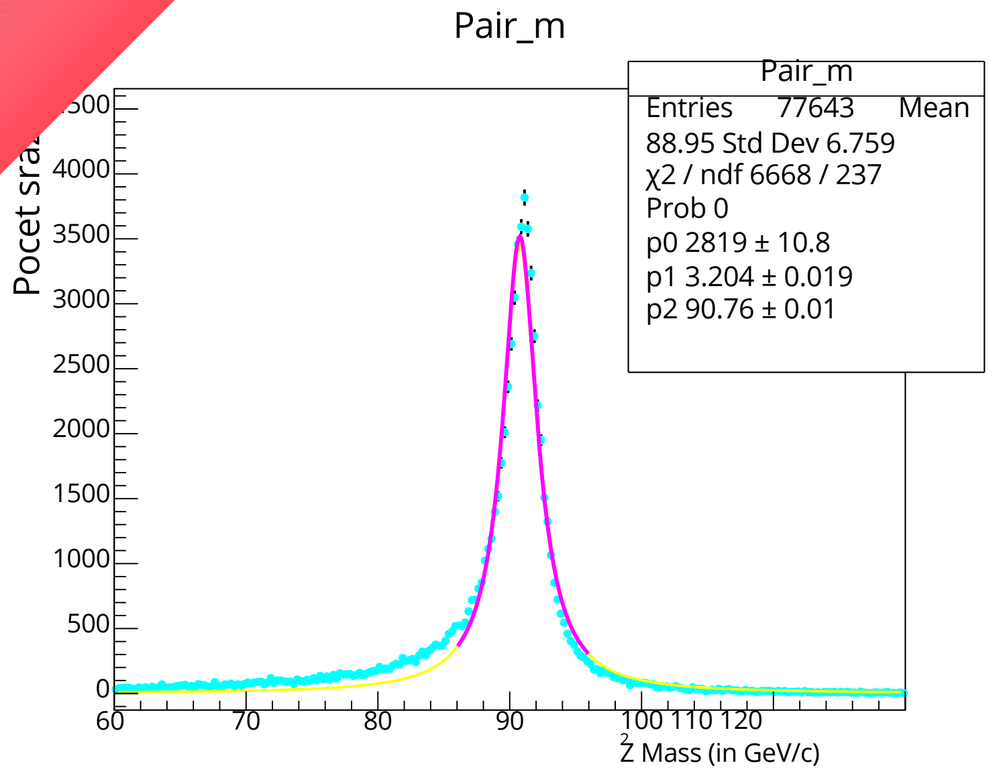
  Simulace dat z urychlovače, mapa rozpadů a srážek
- Data jsou analyzována jednoduchým programem
- Outputem jsou grafy hodnot a veličin

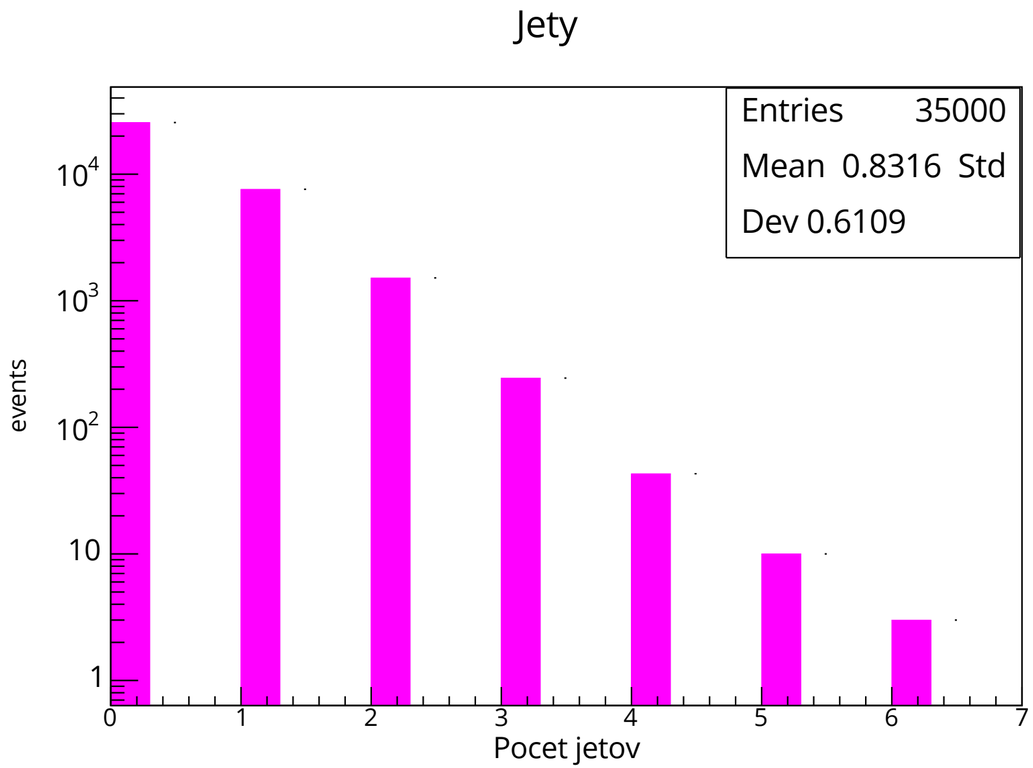


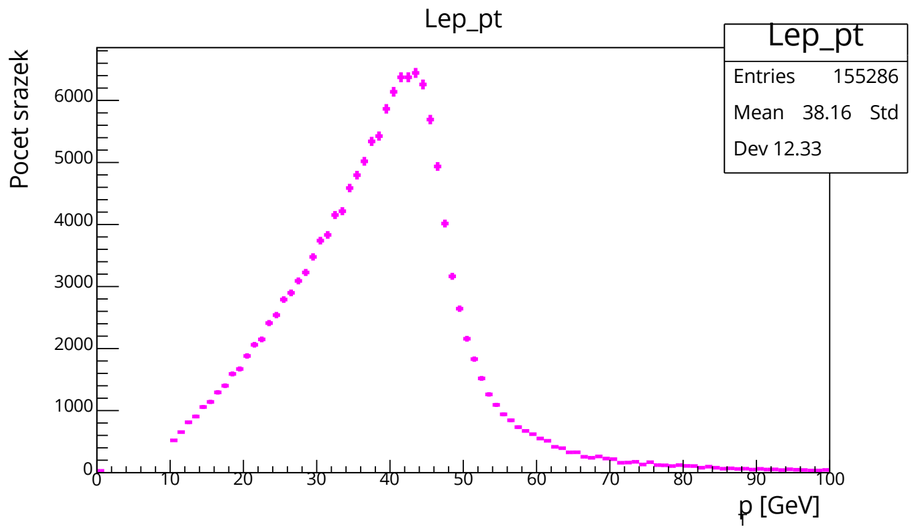

h_B
h_A
$\bar{q}$
q
γ^*, Z^*
l
$\bar{l}$

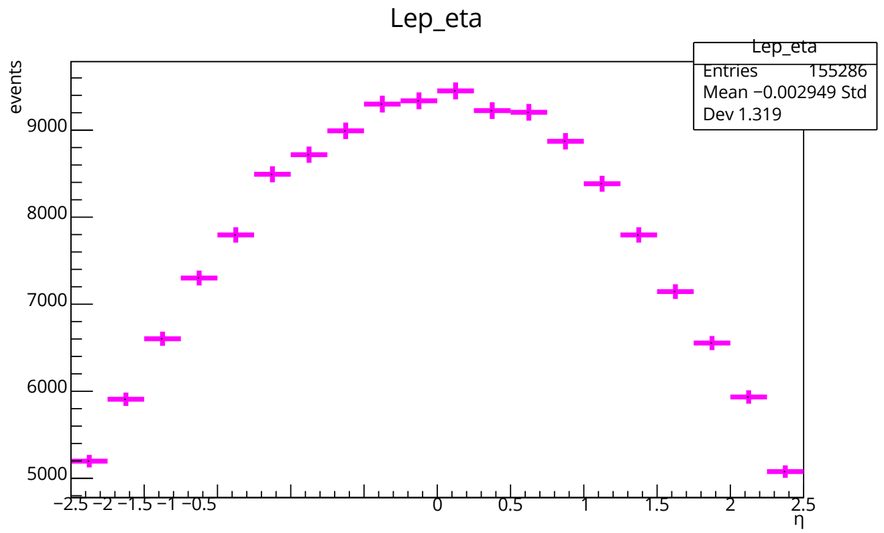
Měřené veličiny

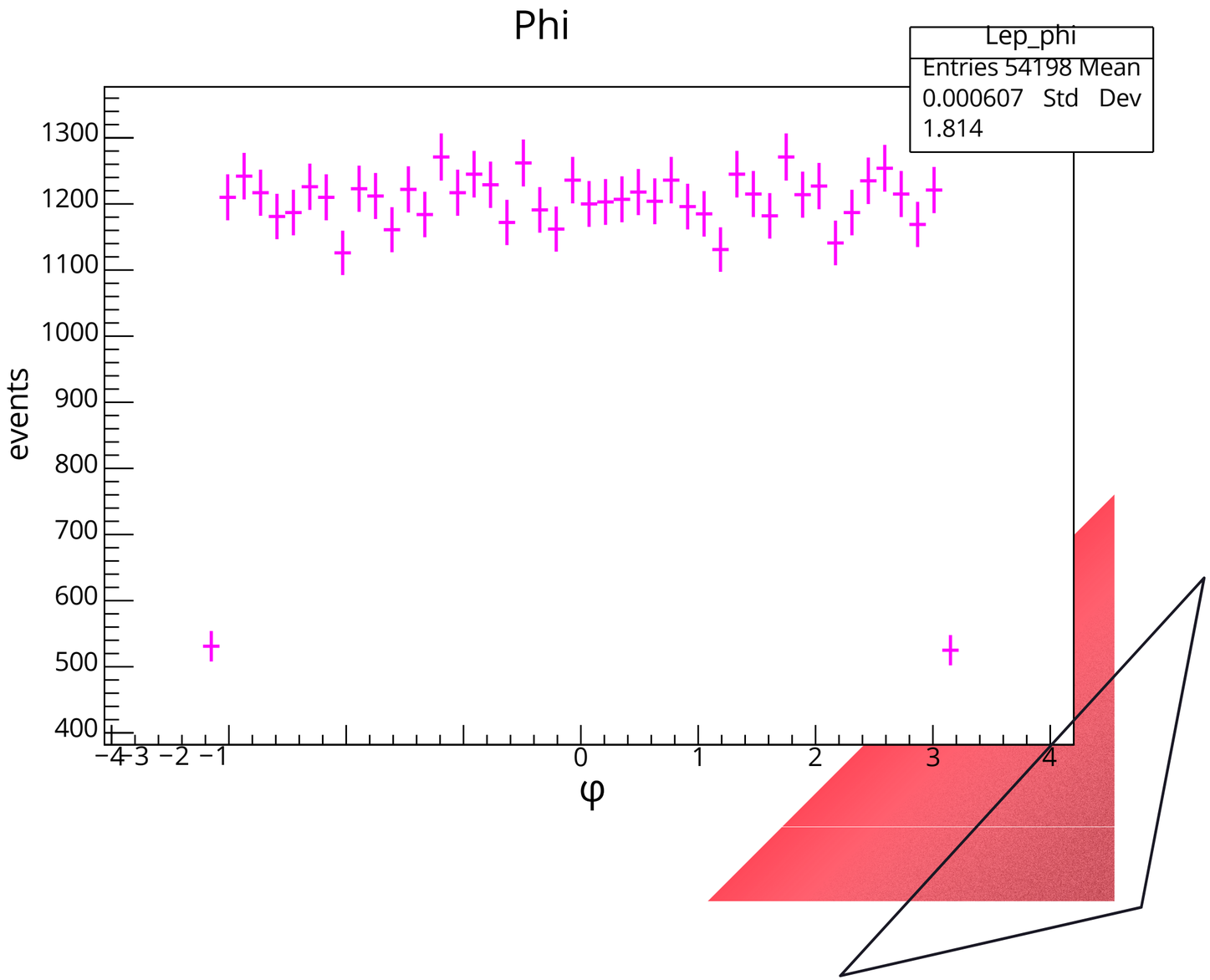
- Hmotnost bosonu Z
- Počet jetů
- Příčný řez
- Pseudorapidita
- Úhel phi

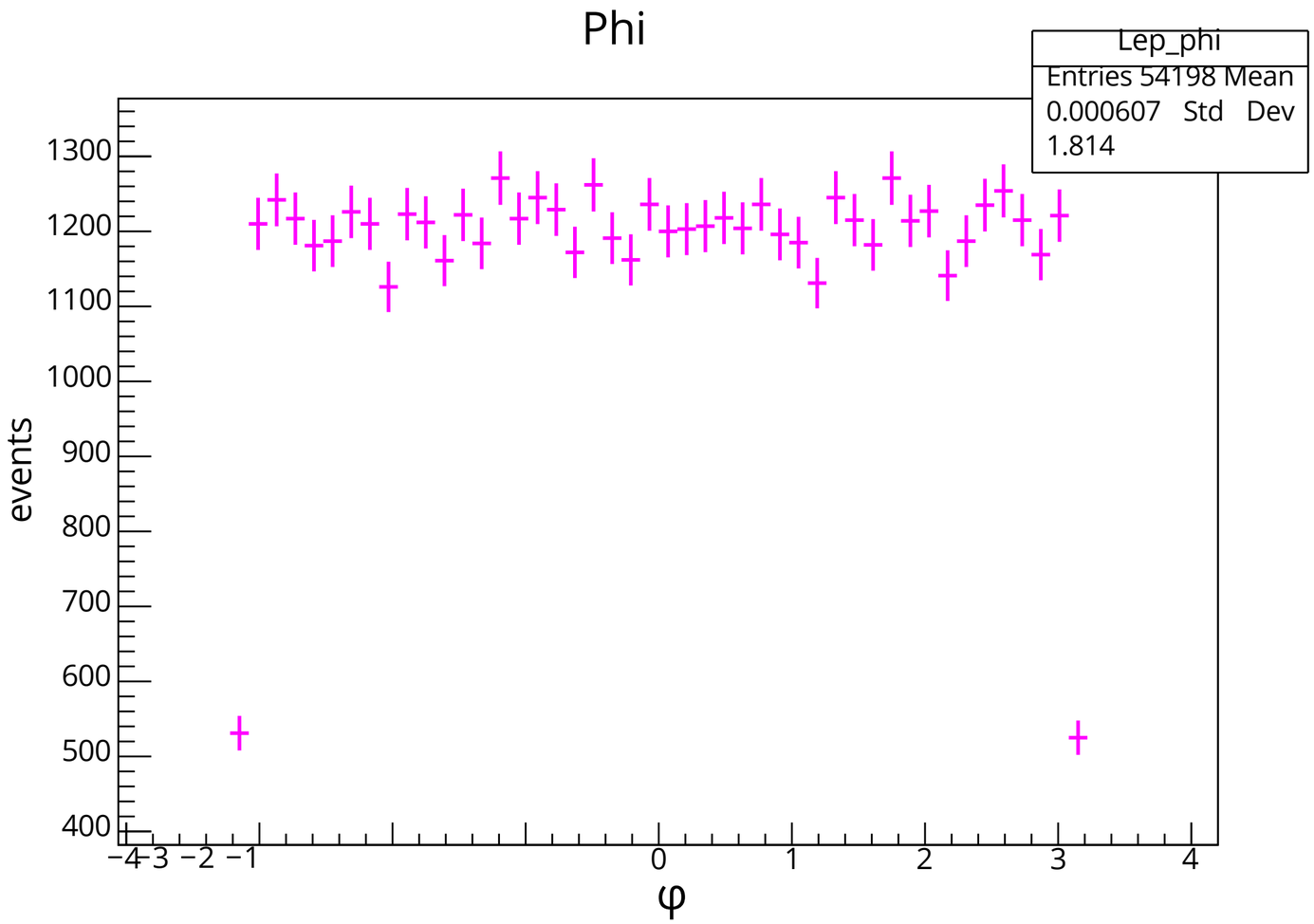

Pair_m
Pair_m
Entries 77643 Mean
88.95 Std Dev 6.759
χ2 / ndf 6668 / 237
Prob 0
p0 2819 ± 10.8
p1 3.204 ± 0.019
p2 90.76 ± 0.01
Pocet sra
4000
3500
3000
2500
2000
1500
1000
500
0
60
70
80
90
100 110 120
Z Mass (in GeV/c)


Jety
Entries 35000
Mean 0.8316 Std
Dev 0.6109
events
10^4
10^3
10^2
10
1
0
1
2
3
4
5
6
7
Pocet jetov


Lep_pt
Lep_pt
Entries 155286
Mean 38.16 Std Dev 12.33
Pocet srazek
p [GeV]


Lep_eta
Lep_eta
Entries 155286
Mean −0.002949 Std Dev 1.319
events
η


Phi
Lep_phi
Entries 54198 Mean 0.000607 Std Dev 1.814
events
φ


Phi
Lep_phi
Entries 54198 Mean
0.000607 Std Dev
1.814
events
1300
1200
1100
1000
900
800
700
600
500
400
−4 −3 −2 −1 0 1 2 3 4
φ

Electric communication will never be a substitute for the face of someone who with their soul encourages another person to be brave and true.

Charles Dickens