Top mass analysis in all jets channel

- event reconstruction
- separation of signal from background

1. Event reconstruction

Events reconstruction based on minimal χ^2

- looking for W jet candidates inside jet triplets
  - looking for combination with minimal $\chi^2_W = \left(\frac{m_{12} - 75}{\sigma_{M_W}}\right)^2$
  - W jet candidates can not be μ tagged
- best combination selection
  - looking for combination with minimal $\chi^2 = \chi^2_{W1} + \chi^2_{W1} + \left(\frac{m_{123} - m_{456}}{\sigma_{m_t}}\right)^2$ $(+\ \chi^2_{Ewlow})$ where
  - $\chi^2_{Ewlow} = \exp(0.7 * (75 - E_{Wt1} - E_{Wt2})) + \exp(0.7 * (75 - E_{Wt3} - E_{Wt4}))$ to suppress combinations with too small W jet energies

2. Separation of signal from background

- Standard cuts on kin. variables
- Neural Network

Standard cuts :

R = 0.5 jets, $E_T >$ 10 GeV, $|\,\eta\,| < 2.5$

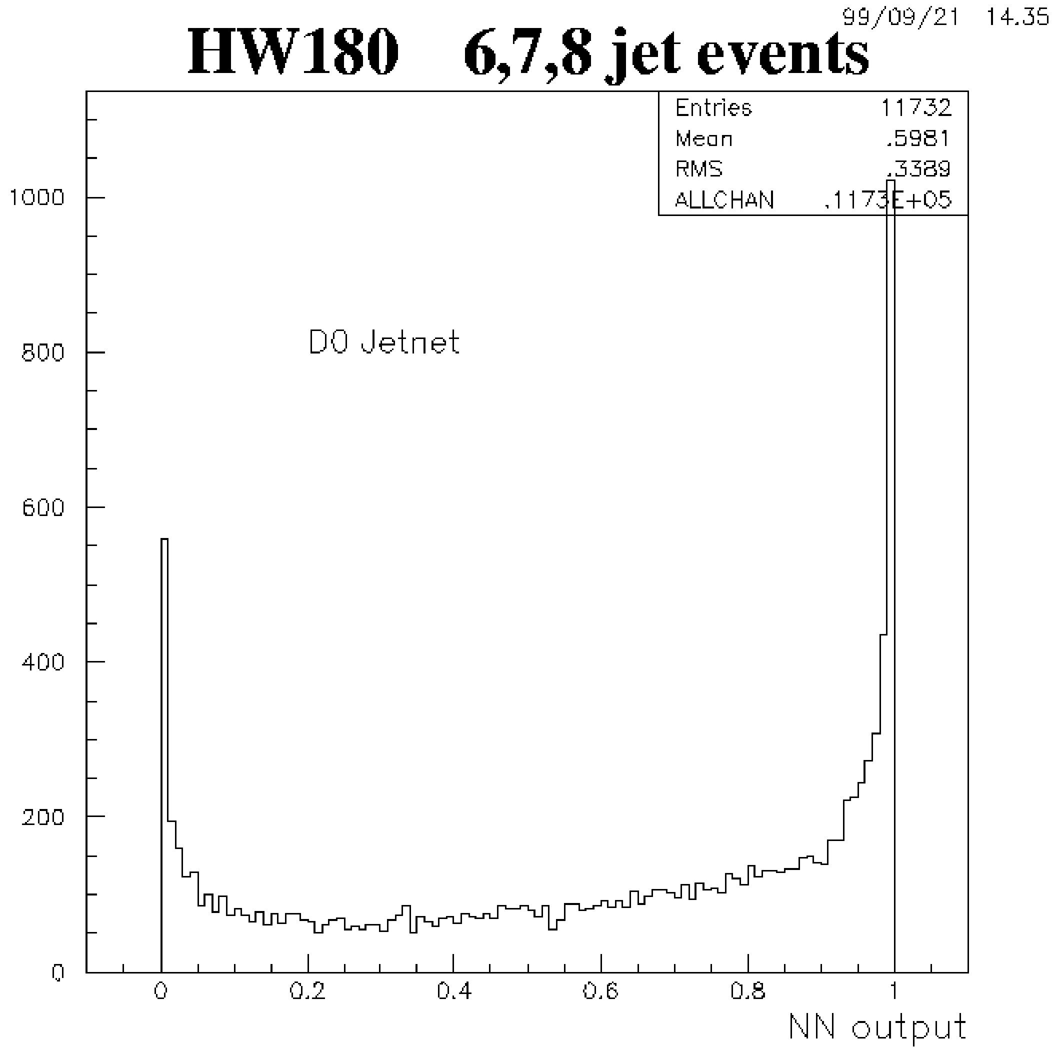
Cuts on H_T, $\sqrt{\hat{s}}$, NJA, aplanarity, sphericity, H_{T3}, $E_{T5,6}$, centrality and $|\ \eta(5) \cdot \eta(6)\ |$ with highest ratio $\frac{s}{\sqrt{B}}$

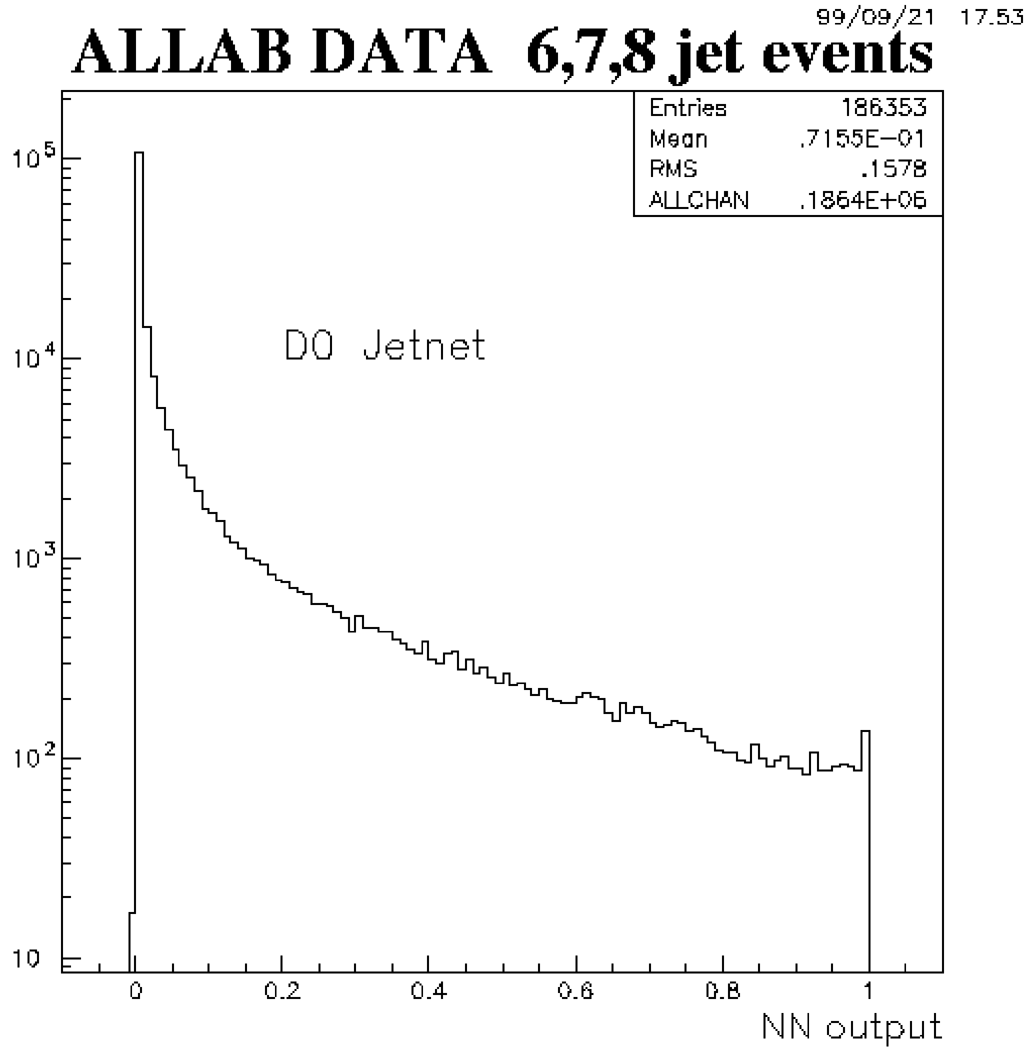
HW180	11819 events with 6 - 8 jets, no isolated e, μ 1014 events passed $\rightarrow$ 8.6 %
ALLAB	213 192 events with 6 - 8 jets, no isolated e, μ 212 events passed $\rightarrow$ 0.1 %

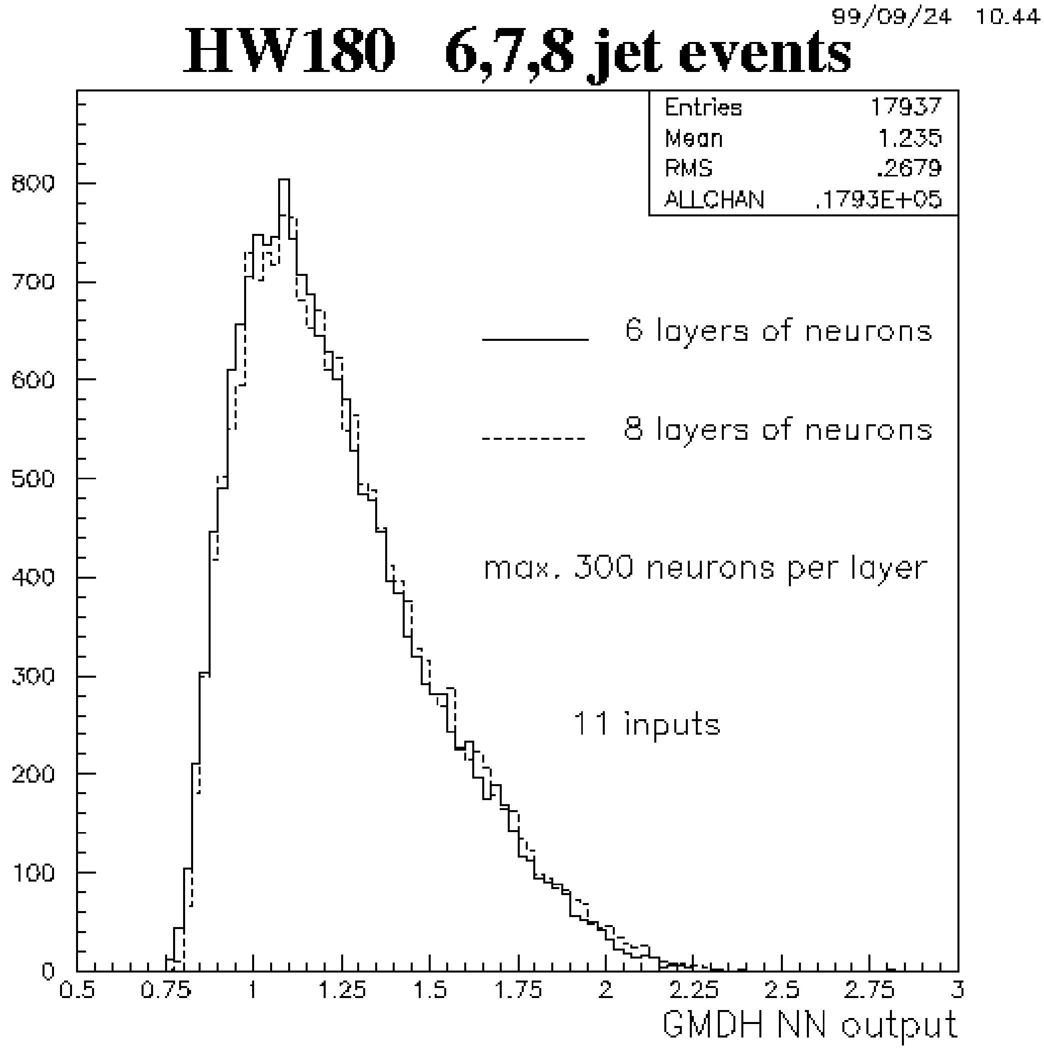
Neural Networks

- D0 Jetnet - NN weights from Maryanne Cummings
- GMDH NN

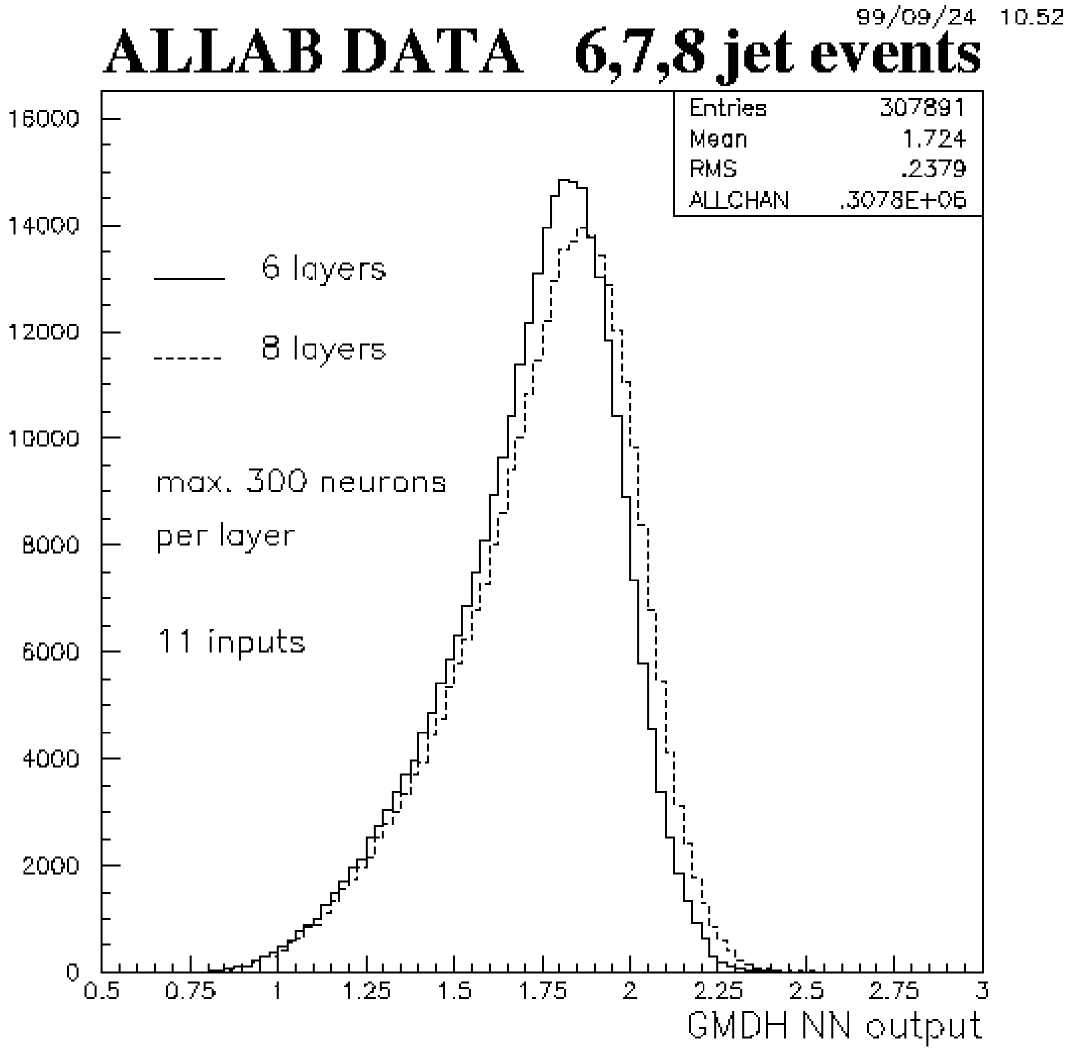
HW180   6,7,8 jet events



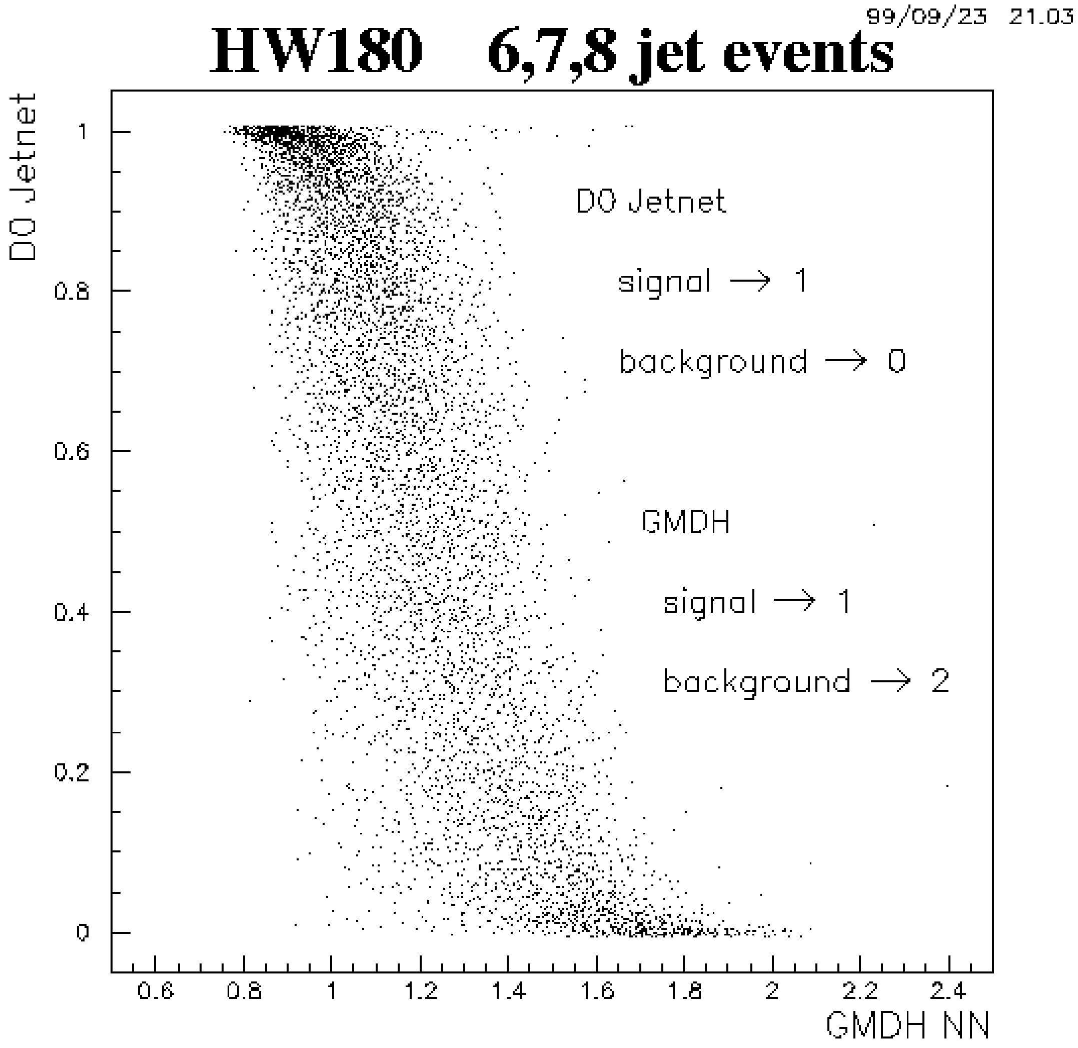

99/09/21 17.53
ALLAB DATA 6,7,8 jet events
Entries 186353
Mean .7155E-01
RMS .1578
ALLCHAN .1864E+06
D0 Jetnet
10^5
10^4
10^3
10^2
10
0
0.2
0.4
0.6
0.8
1
NN output



99/09/24 10.44
HW180 6,7,8 jet events
Entries 17937
Mean 1.235
RMS .2679
ALLCHAN .1793E+05
6 layers of neurons
8 layers of neurons
max. 300 neurons per layer
11 inputs
0
100
200
300
400
500
600
700
800
0.5
0.75
1
1.25
1.5
1.75
2
2.25
2.5
2.75
3
GMDH NN output



99/09/24 10.52
ALLAB DATA 6,7,8 jet events
Entries 307891
Mean 1.724
RMS .2379
ALLCHAN .3078E+06
6 layers
8 layers
max. 300 neurons
per layer
11 inputs
GMDH NN output



99/09/23 21.03
HW180 6,7,8 jet events
D0 Jetnet
1
0.8
0.6
0.4
0.2
0
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
GMDH NN
D0 Jetnet
signal → 1
background → 0
GMDH
signal → 1
background → 2

HW180   6,7,8 jet events