HF jets analysis

16.09.2020 ALICE@IFJ meeting

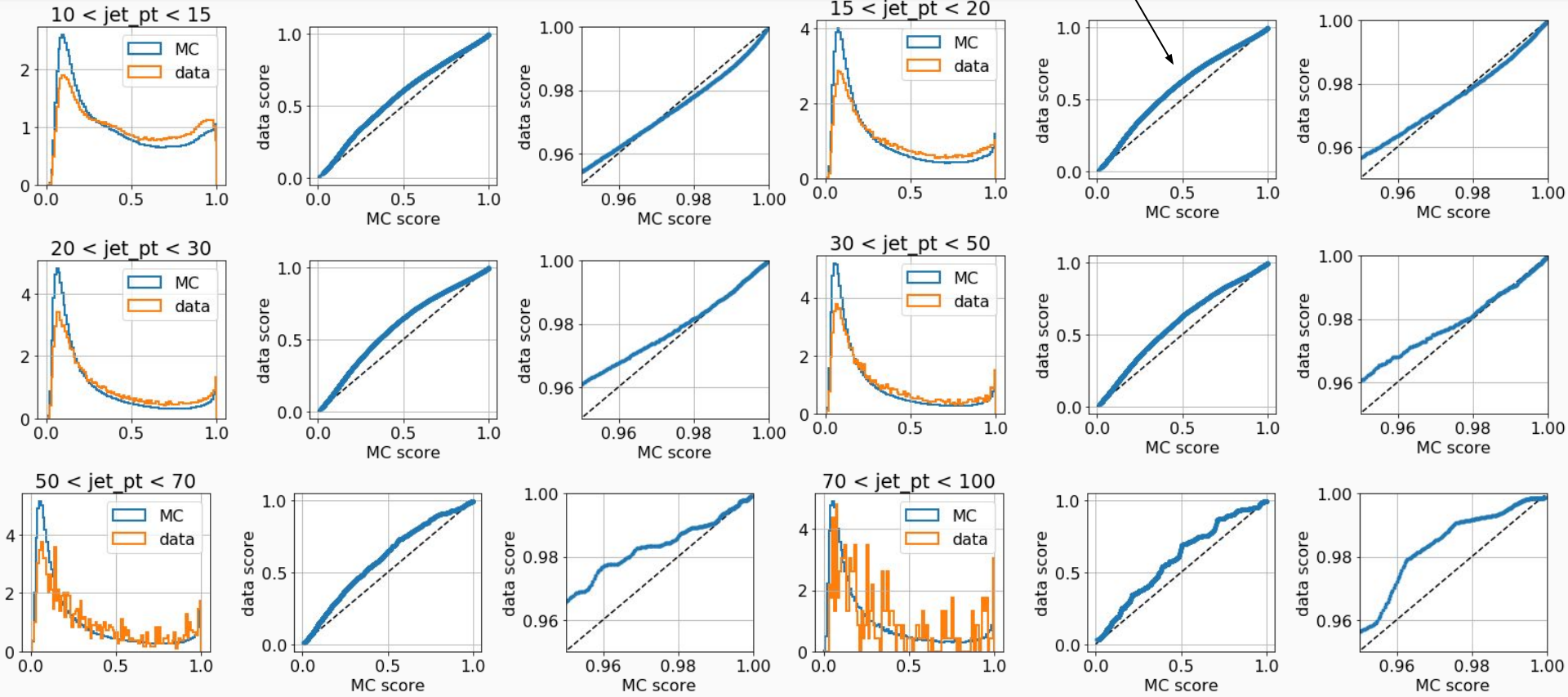
Sebastian Bysiak

Outline

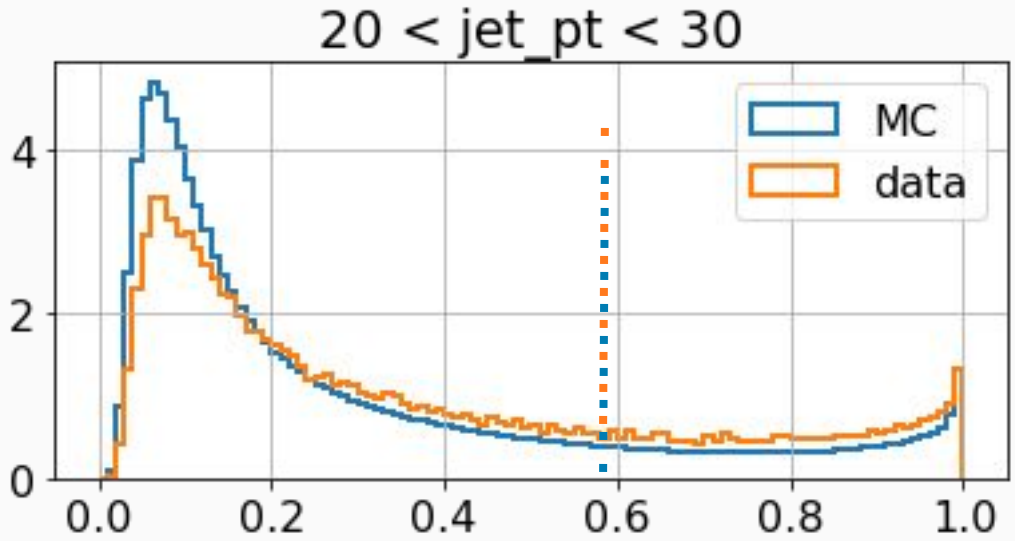
1. Stability improvement with “QQ method”

Score distr.

each dot = score values in data and MC corresponding to this quantile

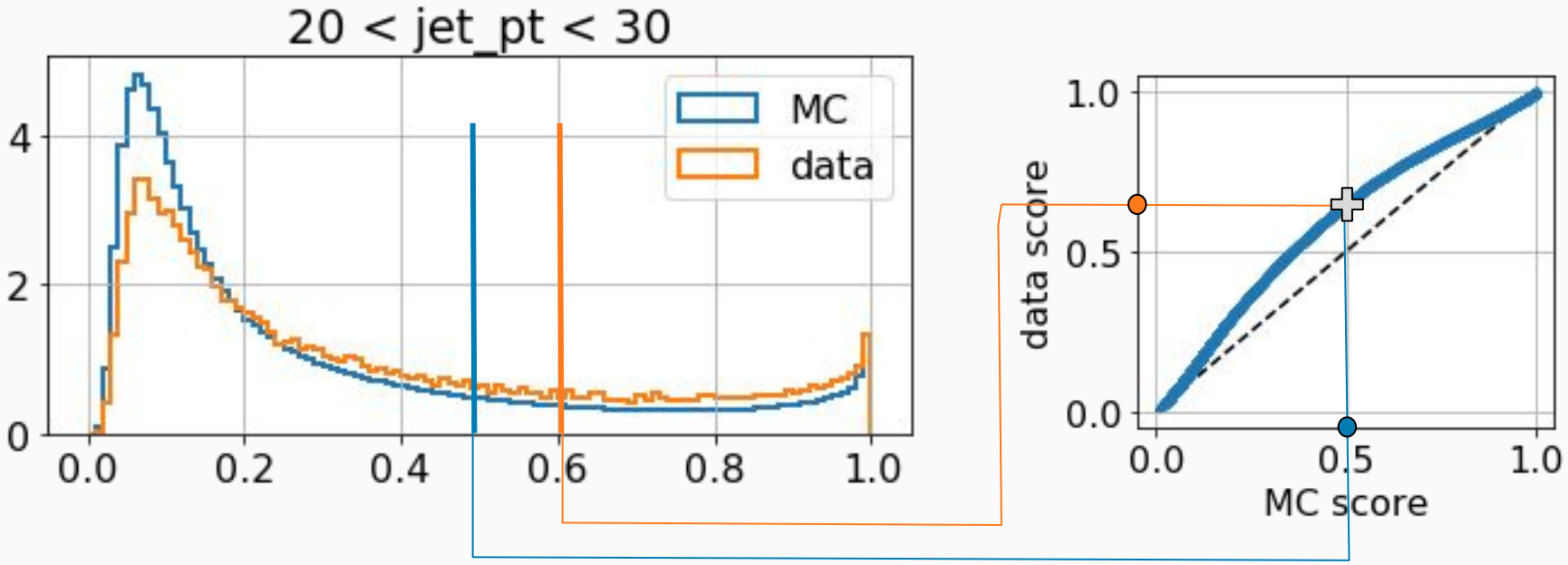


Old way of tagging



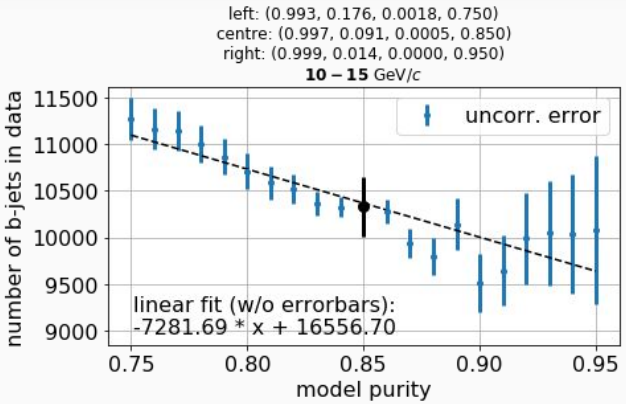
same cut value for data and MC

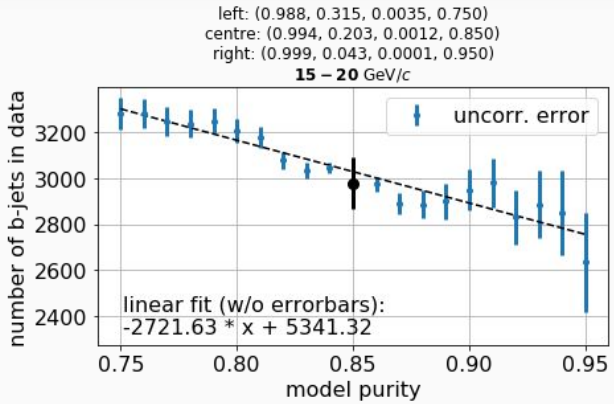
“QQ method”

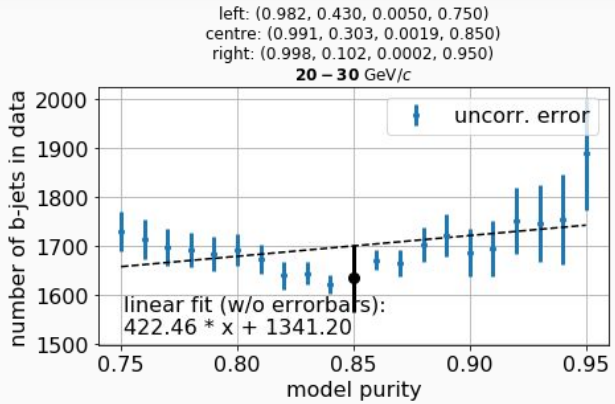


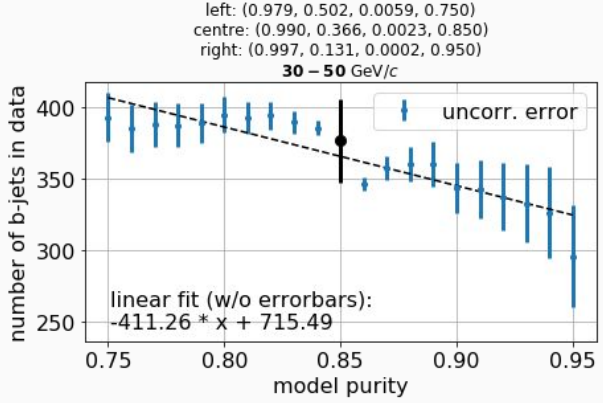
different cut value for data and MC
OR
same cut value if our observable is score quantile instead of score

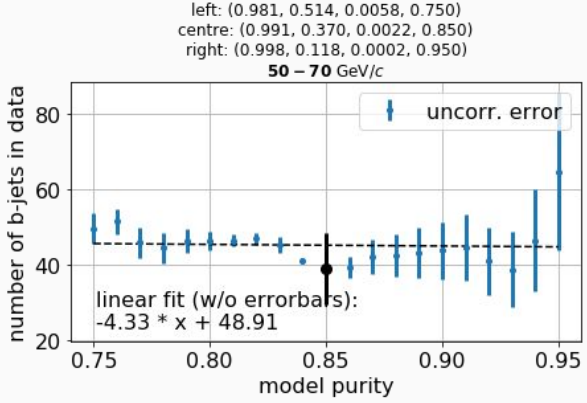
0.75 < P < 0.95

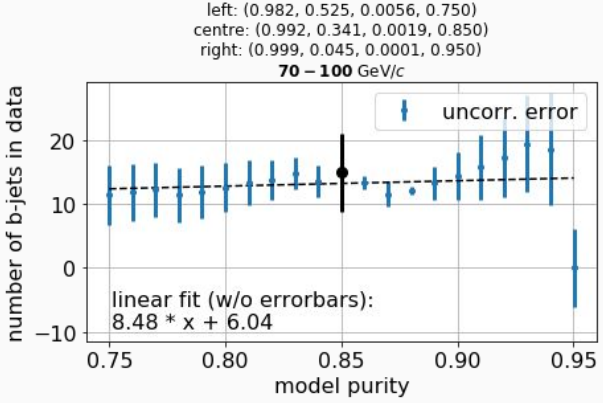

left: (0.993, 0.176, 0.0018, 0.750)
centre: (0.997, 0.091, 0.0005, 0.850)
right: (0.999, 0.014, 0.0000, 0.950)
10 – 15 GeV/c
uncorr. error
linear fit (w/o errorbars):
-7281.69 * x + 16556.70
number of b-jets in data
model purity


left: (0.988, 0.315, 0.0035, 0.750)
centre: (0.994, 0.203, 0.0012, 0.850)
right: (0.999, 0.043, 0.0001, 0.950)
15 – 20 GeV/c
uncorr. error
linear fit (w/o errorbars):
-2721.63 * x + 5341.32
number of b-jets in data
model purity

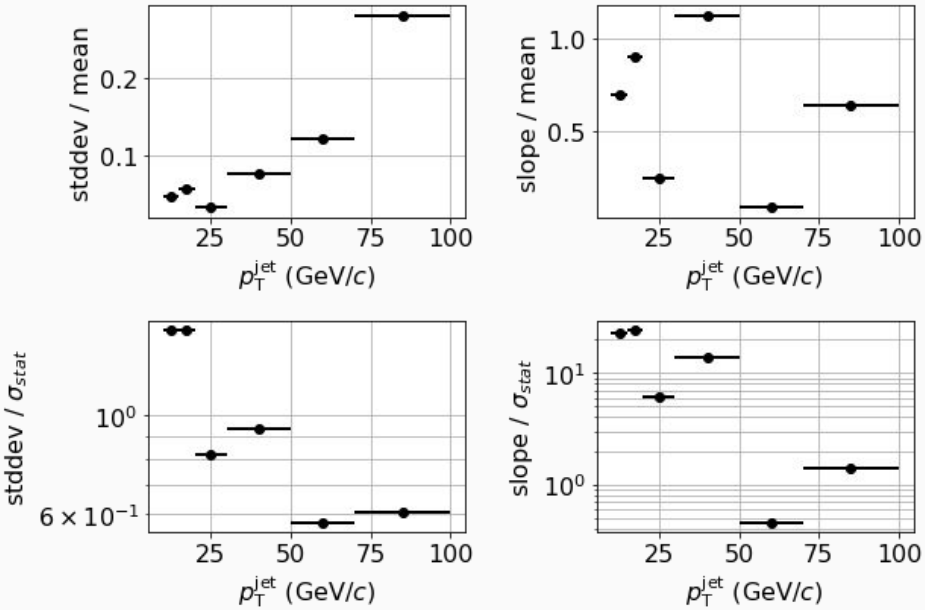

left: (0.982, 0.430, 0.0050, 0.750)
centre: (0.991, 0.303, 0.0019, 0.850)
right: (0.998, 0.102, 0.0002, 0.950)
20 – 30 GeV/c
uncorr. error
linear fit (w/o errorbars):
422.46 * x + 1341.20
number of b-jets in data
model purity


left: (0.979, 0.502, 0.0059, 0.750)
centre: (0.990, 0.366, 0.0023, 0.850)
right: (0.997, 0.131, 0.0002, 0.950)
30 – 50 GeV/c
uncorr. error
linear fit (w/o errorbars):
-411.26 * x + 715.49
number of b-jets in data
model purity


left: (0.981, 0.514, 0.0058, 0.750)
centre: (0.991, 0.370, 0.0022, 0.850)
right: (0.998, 0.118, 0.0002, 0.950)
50 – 70 GeV/c
uncorr. error
linear fit (w/o errorbars):
-4.33 * x + 48.91
number of b-jets in data
model purity


left: (0.982, 0.525, 0.0056, 0.750)
centre: (0.992, 0.341, 0.0019, 0.850)
right: (0.999, 0.045, 0.0001, 0.950)
70 – 100 GeV/c
uncorr. error
linear fit (w/o errorbars):
8.48 * x + 6.04
number of b-jets in data
model purity

0.75 < P < 0.95



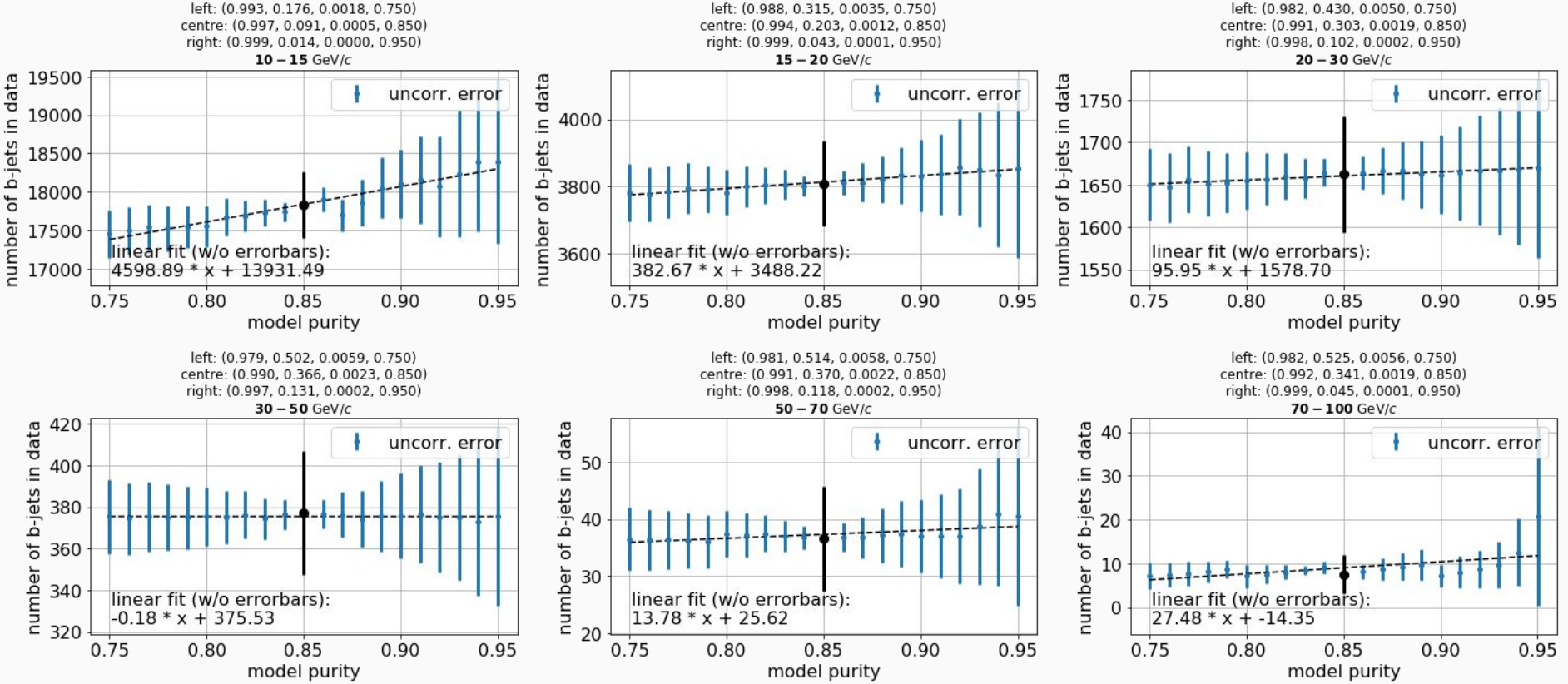
right: stddev ~ 1 σ_{sys}

left: slope ~ maximal deviation, in range 0 < P < 1

top row: compared to mean

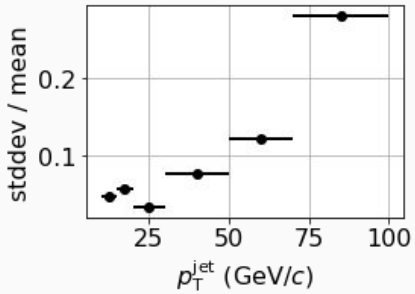
bottom row: compared to σ_{stat}

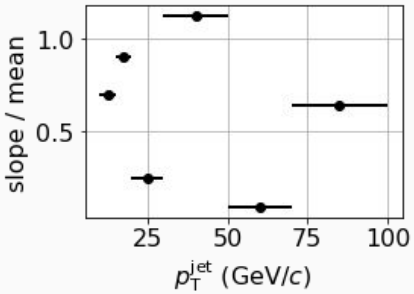
0.75 < P < 0.95, QQ

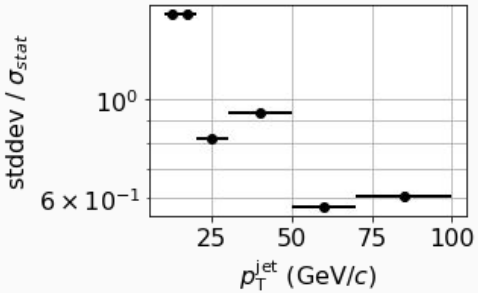

left: (0.993, 0.176, 0.0018, 0.750)
centre: (0.997, 0.091, 0.0005, 0.850)
right: (0.999, 0.014, 0.0000, 0.950)
10 – 15 GeV/c
uncorr. error
linear fit (w/o errorbars):
4598.89 * x + 13931.49
number of b-jets in data
model purity
left: (0.988, 0.315, 0.0035, 0.750)
centre: (0.994, 0.203, 0.0012, 0.850)
right: (0.999, 0.043, 0.0001, 0.950)
15 – 20 GeV/c
uncorr. error
linear fit (w/o errorbars):
382.67 * x + 3488.22
number of b-jets in data
model purity
left: (0.982, 0.430, 0.0050, 0.750)
centre: (0.991, 0.303, 0.0019, 0.850)
right: (0.998, 0.102, 0.0002, 0.950)
20 – 30 GeV/c
uncorr. error
linear fit (w/o errorbars):
95.95 * x + 1578.70
number of b-jets in data
model purity
left: (0.979, 0.502, 0.0059, 0.750)
centre: (0.990, 0.366, 0.0023, 0.850)
right: (0.997, 0.131, 0.0002, 0.950)
30 – 50 GeV/c
uncorr. error
linear fit (w/o errorbars):
-0.18 * x + 375.53
number of b-jets in data
model purity
left: (0.981, 0.514, 0.0058, 0.750)
centre: (0.991, 0.370, 0.0022, 0.850)
right: (0.998, 0.118, 0.0002, 0.950)
50 – 70 GeV/c
uncorr. error
linear fit (w/o errorbars):
13.78 * x + 25.62
number of b-jets in data
model purity
left: (0.982, 0.525, 0.0056, 0.750)
centre: (0.992, 0.341, 0.0019, 0.850)
right: (0.999, 0.045, 0.0001, 0.950)
70 – 100 GeV/c
uncorr. error
linear fit (w/o errorbars):
27.48 * x + -14.35
number of b-jets in data
model purity

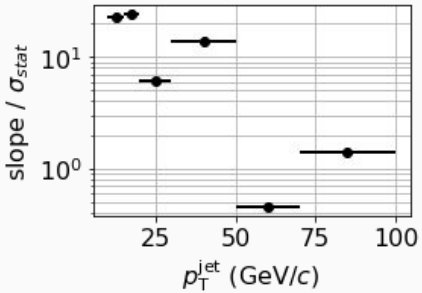
0.75 < P < 0.95

standard

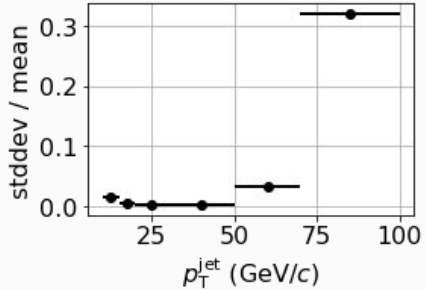


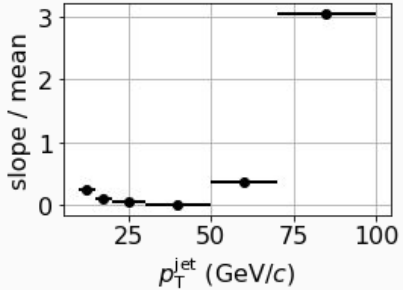


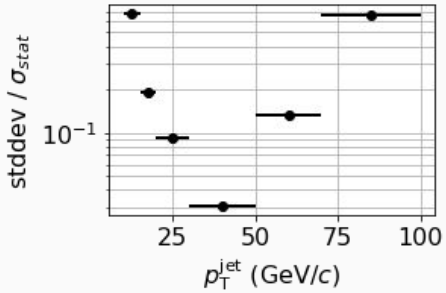


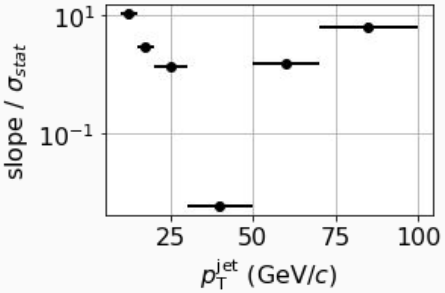


QQ

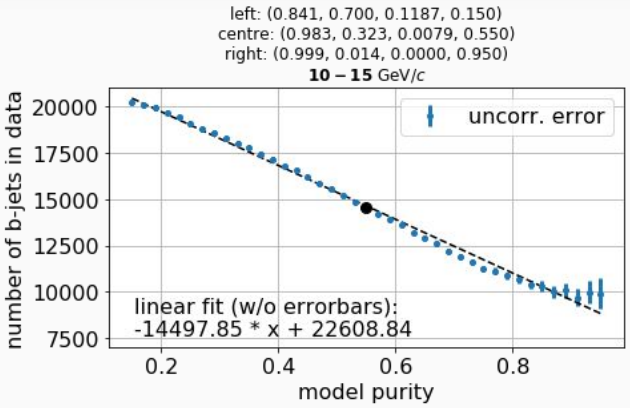


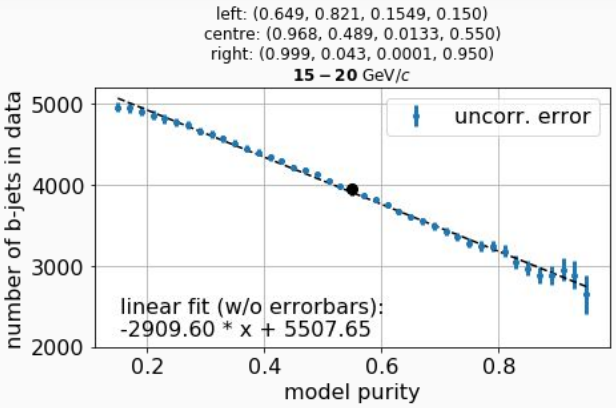


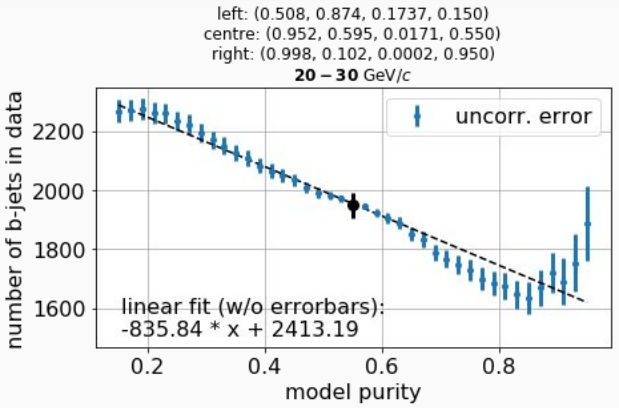


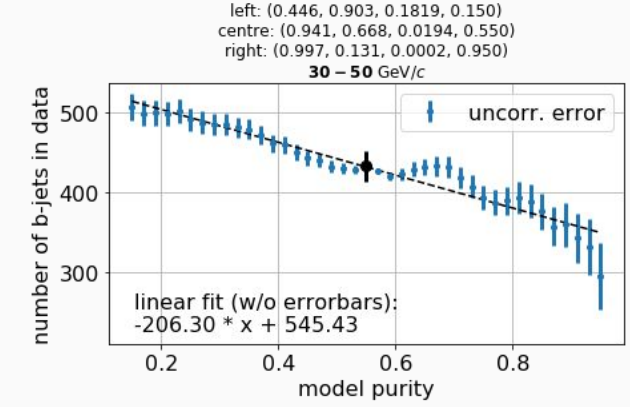


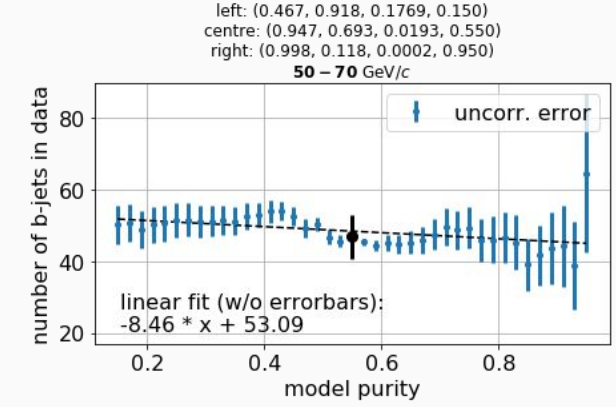
0.15 < P < 0.95

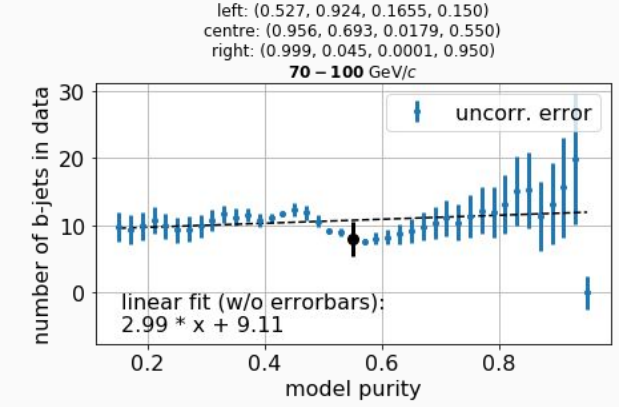

left: (0.841, 0.700, 0.1187, 0.150)
centre: (0.983, 0.323, 0.0079, 0.550)
right: (0.999, 0.014, 0.0000, 0.950)
10 – 15 GeV/c
uncorr. error
linear fit (w/o errorbars):
-14497.85 * x + 22608.84
number of b-jets in data
model purity


left: (0.649, 0.821, 0.1549, 0.150)
centre: (0.968, 0.489, 0.0133, 0.550)
right: (0.999, 0.043, 0.0001, 0.950)
15 – 20 GeV/c
uncorr. error
linear fit (w/o errorbars):
-2909.60 * x + 5507.65
number of b-jets in data
model purity

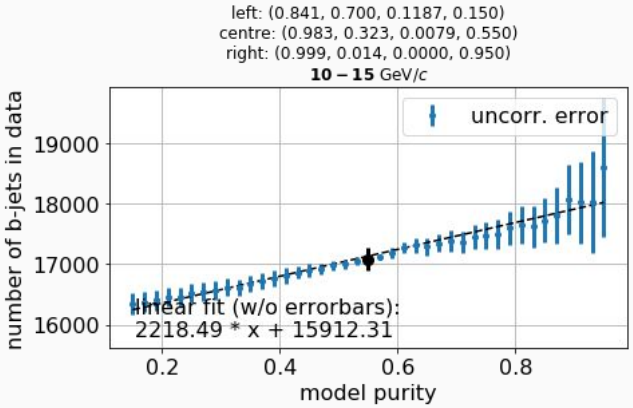

left: (0.508, 0.874, 0.1737, 0.150)
centre: (0.952, 0.595, 0.0171, 0.550)
right: (0.998, 0.102, 0.0002, 0.950)
20 – 30 GeV/c
uncorr. error
linear fit (w/o errorbars):
-835.84 * x + 2413.19
number of b-jets in data
model purity

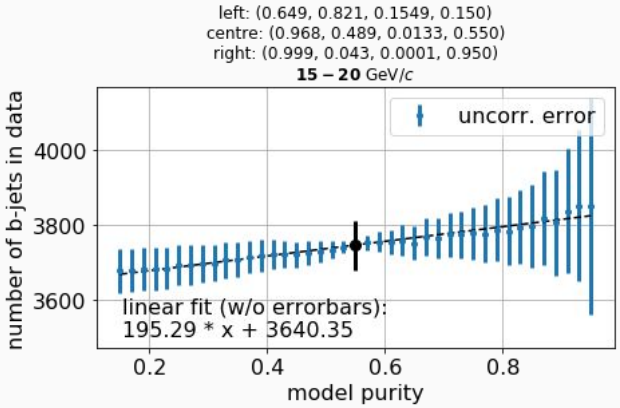

left: (0.446, 0.903, 0.1819, 0.150)
centre: (0.941, 0.668, 0.0194, 0.550)
right: (0.997, 0.131, 0.0002, 0.950)
30 – 50 GeV/c
uncorr. error
linear fit (w/o errorbars):
-206.30 * x + 545.43
number of b-jets in data
model purity

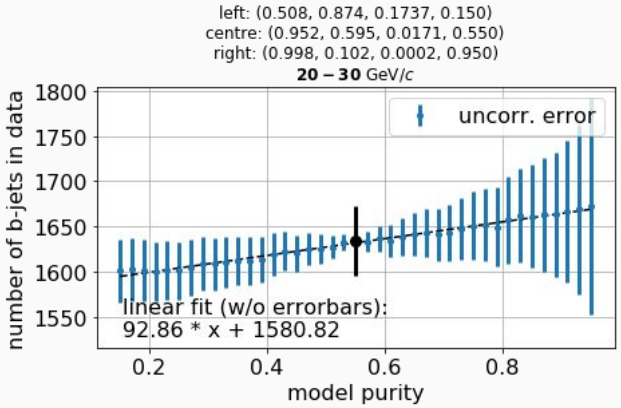

left: (0.467, 0.918, 0.1769, 0.150)
centre: (0.947, 0.693, 0.0193, 0.550)
right: (0.998, 0.118, 0.0002, 0.950)
50 – 70 GeV/c
uncorr. error
linear fit (w/o errorbars):
-8.46 * x + 53.09
number of b-jets in data
model purity

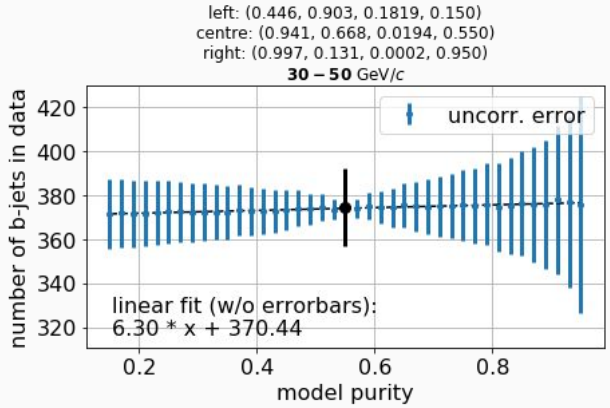

left: (0.527, 0.924, 0.1655, 0.150)
centre: (0.956, 0.693, 0.0179, 0.550)
right: (0.999, 0.045, 0.0001, 0.950)
70 – 100 GeV/c
uncorr. error
linear fit (w/o errorbars):
2.99 * x + 9.11
number of b-jets in data
model purity

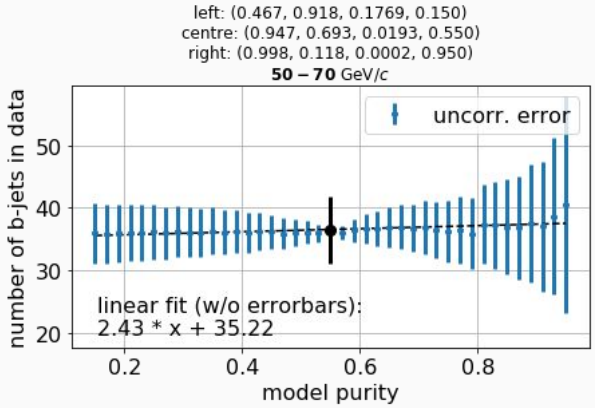
0.15 < P < 0.95, QQ

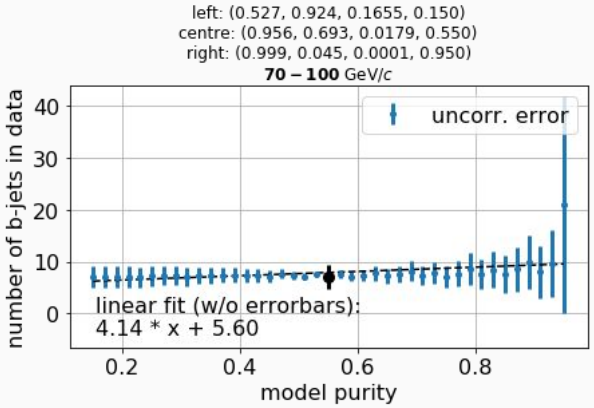

left: (0.841, 0.700, 0.1187, 0.150)
centre: (0.983, 0.323, 0.0079, 0.550)
right: (0.999, 0.014, 0.0000, 0.950)
10 – 15 GeV/c
uncorr. error
linear fit (w/o errorbars):
2218.49 * x + 15912.31
number of b-jets in data
model purity


left: (0.649, 0.821, 0.1549, 0.150)
centre: (0.968, 0.489, 0.0133, 0.550)
right: (0.999, 0.043, 0.0001, 0.950)
15 – 20 GeV/c
uncorr. error
linear fit (w/o errorbars):
195.29 * x + 3640.35
number of b-jets in data
model purity


left: (0.508, 0.874, 0.1737, 0.150)
centre: (0.952, 0.595, 0.0171, 0.550)
right: (0.998, 0.102, 0.0002, 0.950)
20 – 30 GeV/c
uncorr. error
linear fit (w/o errorbars):
92.86 * x + 1580.82
number of b-jets in data
model purity

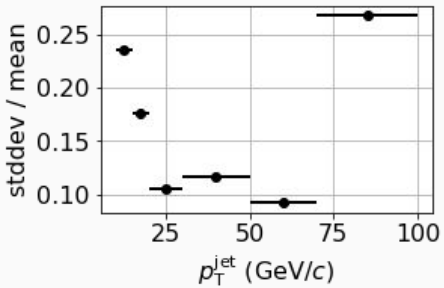

left: (0.446, 0.903, 0.1819, 0.150)
centre: (0.941, 0.668, 0.0194, 0.550)
right: (0.997, 0.131, 0.0002, 0.950)
30 – 50 GeV/c
uncorr. error
linear fit (w/o errorbars):
6.30 * x + 370.44
number of b-jets in data
model purity

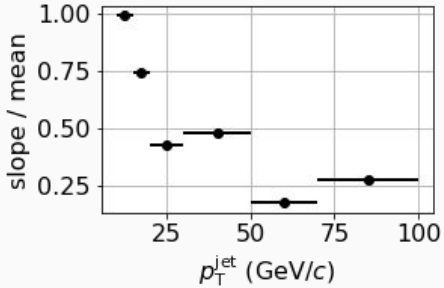

left: (0.467, 0.918, 0.1769, 0.150)
centre: (0.947, 0.693, 0.0193, 0.550)
right: (0.998, 0.118, 0.0002, 0.950)
50 – 70 GeV/c
uncorr. error
linear fit (w/o errorbars):
2.43 * x + 35.22
number of b-jets in data
model purity

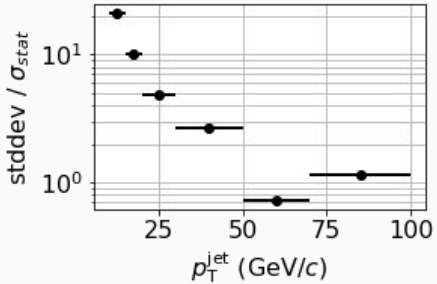

left: (0.527, 0.924, 0.1655, 0.150)
centre: (0.956, 0.693, 0.0179, 0.550)
right: (0.999, 0.045, 0.0001, 0.950)
70 – 100 GeV/c
uncorr. error
linear fit (w/o errorbars):
4.14 * x + 5.60
number of b-jets in data
model purity

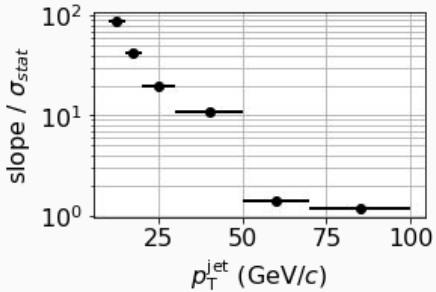
0.15 < P < 0.95

standard

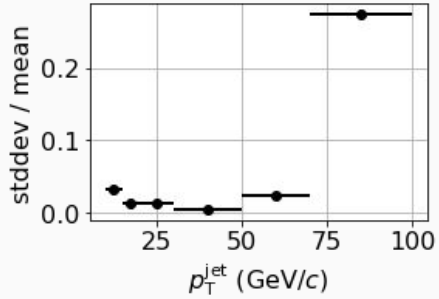


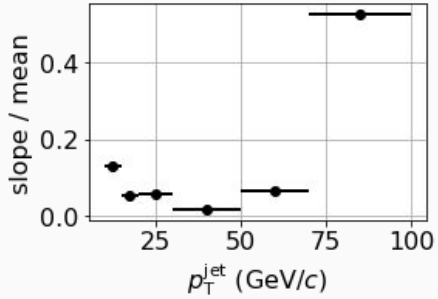


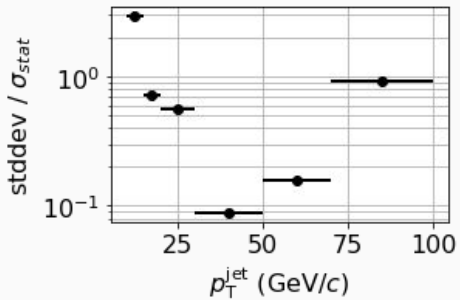


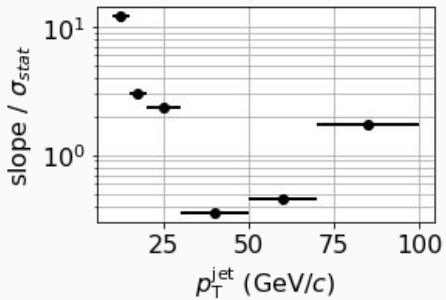


QQ

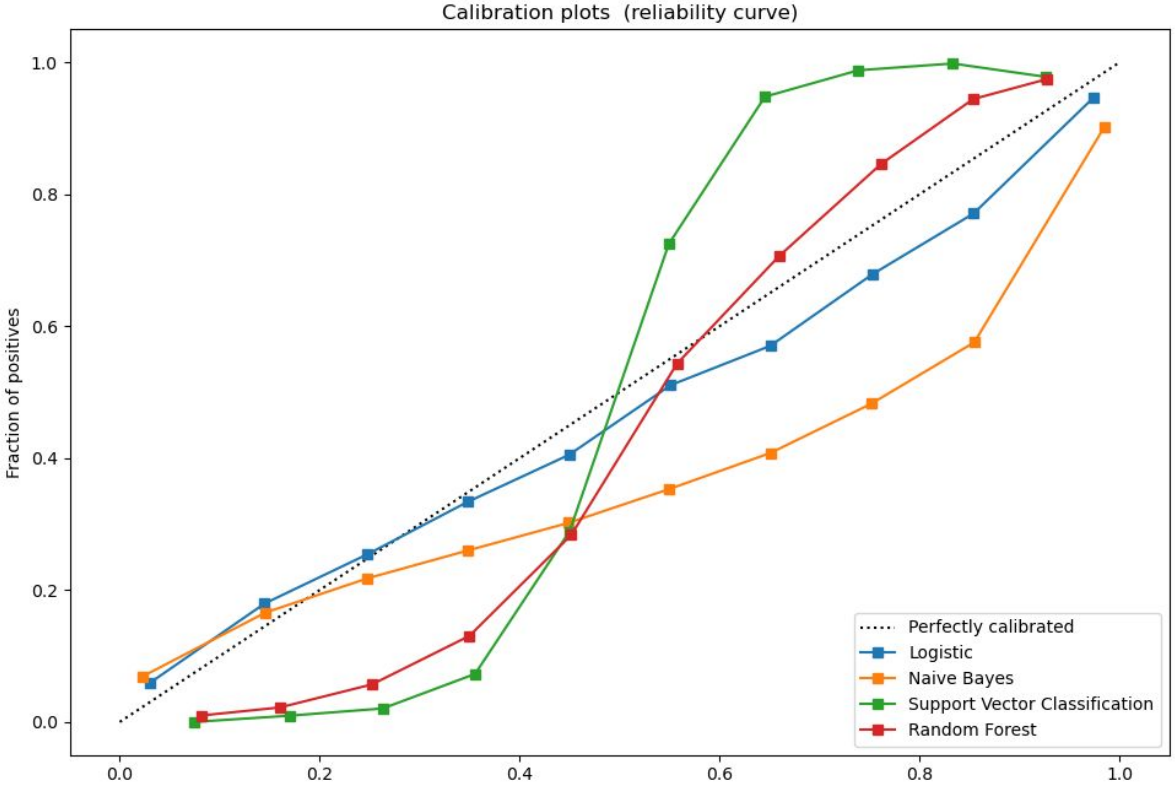






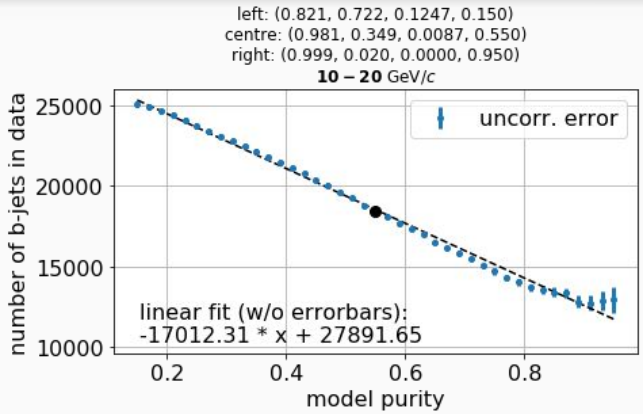


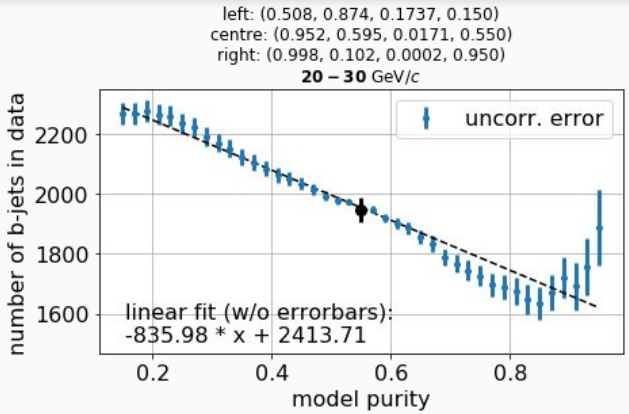
Backup

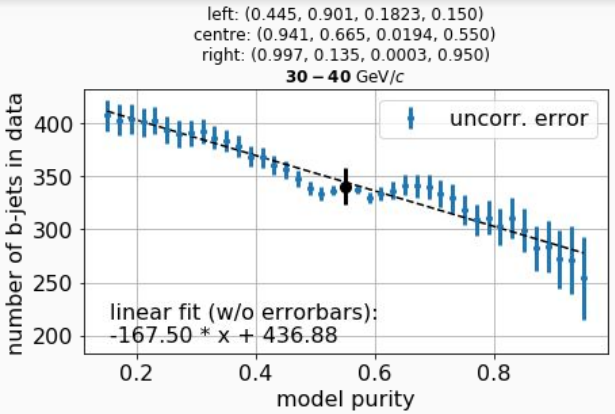


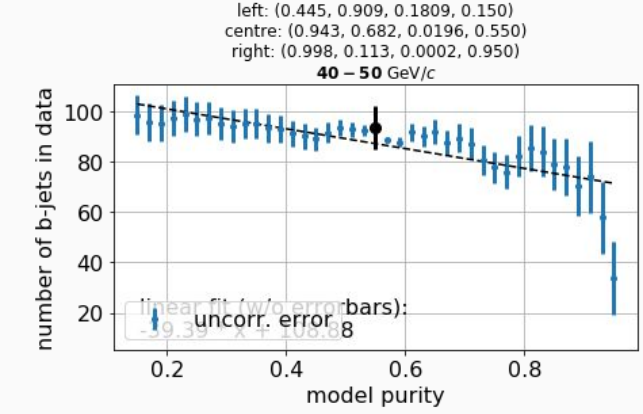
maybe model does not assign proper score, but it at least sorts the jets correctly

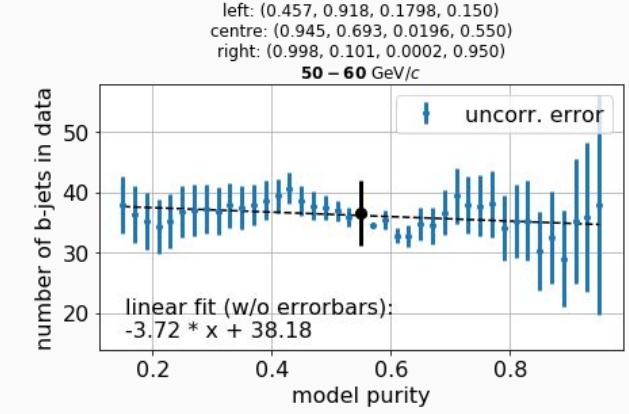
0.15 < P < 0.95, different binning

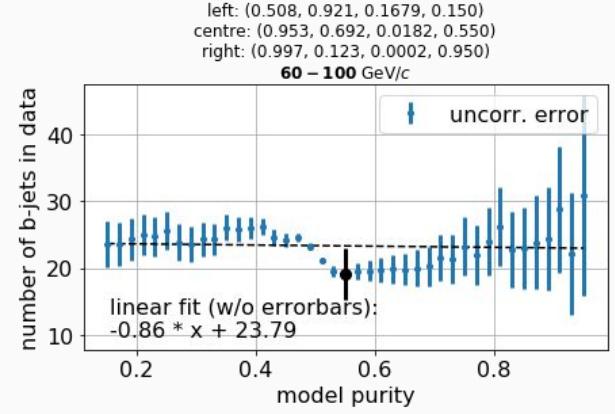




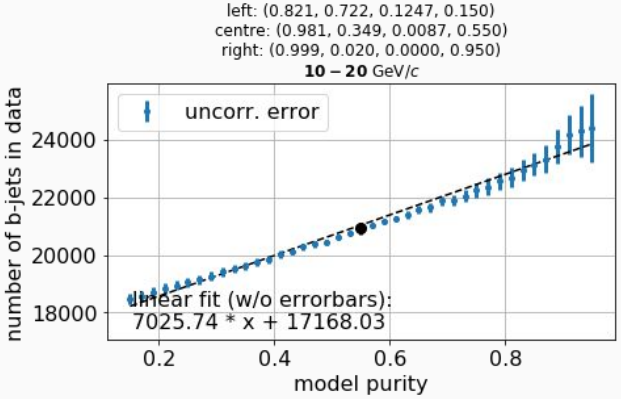


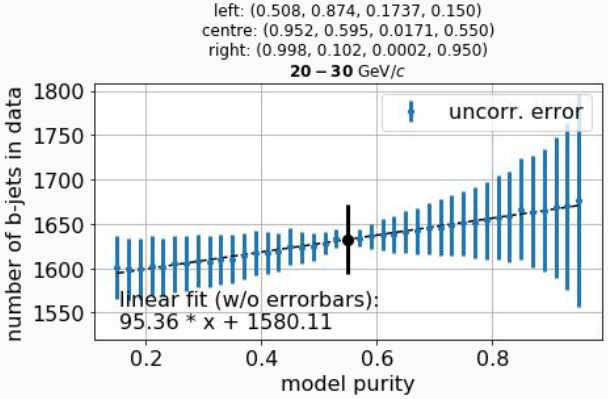


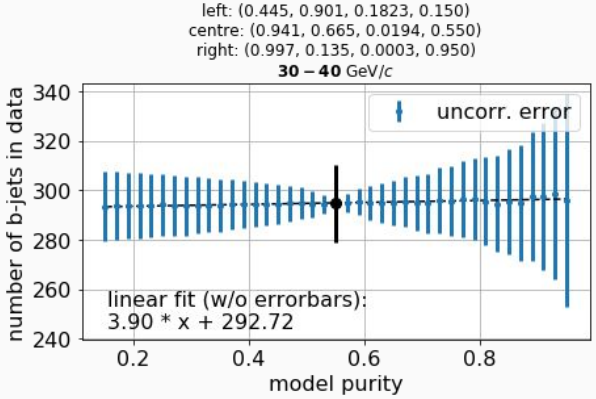


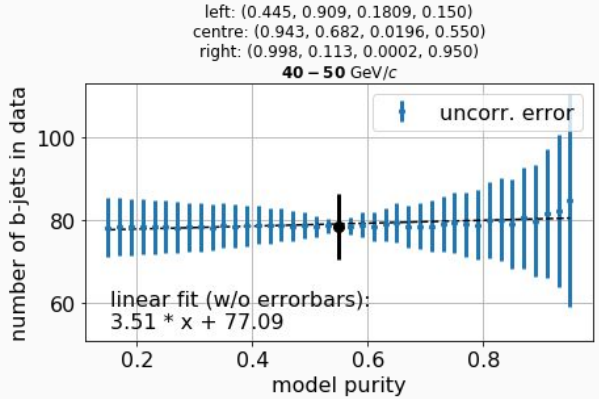


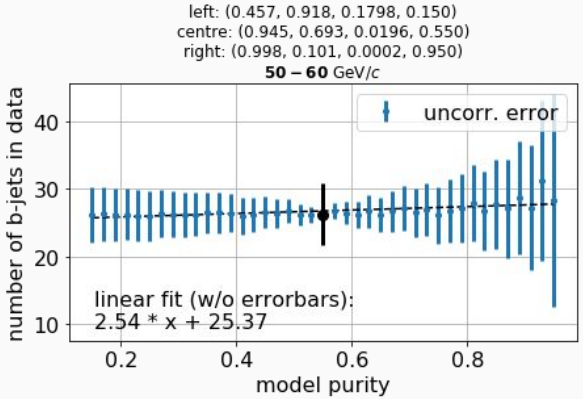
0.15 < P < 0.95, QQ, different binning

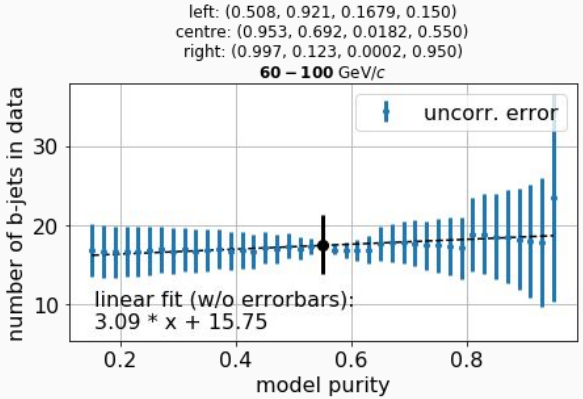












0.15 < P < 0.95, different binning

standard

QQ