Hypothesis plots summary

1666957, Gustavo Espinal Lugo

December 8, 2021

Plots and corresponding metadata

Number of data points used: 99999,
mean expected W mass: 80.36010913 $[GeV/c^2]$,
mean hypothesis masses: [79. 80. 81. 82. 83.] $[GeV/c^2]$,
mass width: 2.07041274 $[GeV/c^2]$,
chi_square value of hypothesis fit: 6.531852285505571
Absolute path to figure: /home/physics/phuxdp/Desktop/WBosonProject/templates_2/plots/muPT_80.360109
Next lines are the data of the shown histograms (if needed):
All quantities: 99999, 80.36010913, [79. 80. 81. 82. 83.], 2.07041274, 6.531852285505571
X_energ_vls = [30.1, 30.299999999999997, 30.5, 30.700000000000003, 30.9, 31.1, 31.299999999999997,
31.5, 31.700000000000003, 31.9, 32.1, 32.3, 32.5, 32.7, 32.9, 33.1, 33.3, 33.5, 33.7, 33.9, 34.1,
34.3, 34.5, 34.7, 34.9, 35.1, 35.3, 35.5, 35.7, 35.9, 36.1, 36.3, 36.5, 36.7, 36.9, 37.1, 37.3, 37.5,
37.7, 37.9, 38.1, 38.3, 38.5, 38.7, 38.9, 39.1, 39.3, 39.5, 39.7, 39.9, 40.1, 40.3, 40.5, 40.7, 40.9,
41.1, 41.3, 41.5, 41.7, 41.9, 42.1, 42.3, 42.5, 42.7, 42.9, 43.1, 43.3, 43.5, 43.7, 43.9, 44.1, 44.3,
44.5, 44.7, 44.9, 45.1, 45.3, 45.5, 45.7, 45.9, 46.1, 46.300000000000004, 46.5, 46.7, 46.9, 47.1,
47.300000000000004, 47.5, 47.7, 47.9, 48.1, 48.300000000000004, 48.5, 48.7, 48.9, 49.1, 49.30000000000
49.5, 49.7, 49.9]
Y_data_bin_cnts = [561.0, 589.0, 591.0, 597.0, 577.0, 617.0, 675.0, 622.0, 604.0, 656.0, 641.0,
599.0, 648.0, 603.0, 658.0, 732.0, 664.0, 684.0, 727.0, 714.0, 666.0, 665.0, 693.0, 662.0, 720.0,
717.0, 701.0, 689.0, 786.0, 675.0, 733.0, 725.0, 752.0, 759.0, 715.0, 764.0, 669.0, 698.0, 729.0,
754.0, 767.0, 749.0, 732.0, 764.0, 748.0, 731.0, 704.0, 714.0, 667.0, 598.0, 639.0, 618.0, 599.0,
588.0, 561.0, 575.0, 497.0, 482.0, 464.0, 452.0, 423.0, 373.0, 408.0, 383.0, 359.0, 324.0, 378.0,
325.0, 307.0, 307.0, 275.0, 252.0, 270.0, 260.0, 253.0, 226.0, 218.0, 216.0, 191.0, 154.0, 202.0,
202.0, 167.0, 168.0, 182.0, 163.0, 151.0, 152.0, 171.0, 170.0, 149.0, 114.0, 127.0, 128.0, 131.0,
115.0, 126.0, 124.0, 119.0, 108.0]
Y_model_bin_cnts = [506.42425537109375, 531.495361328125, 533.07763671875, 538.2734375,
520.0304565429688, 555.85791015625, 607.8571166992188, 559.8966674804688, 543.4588012695312,
589.9934692382812, 576.259033203125, 538.269775390625, 582.048828125, 541.394287109375,
590.5095825195312, 656.6342163085938, 595.3634643554688, 613.0169677734375, 651.2606201171875
639.3153686523438, 596.0662841796875, 594.890869140625, 619.6448364257812, 591.6447143554688,
643.17236328125, 640.1864624023438, 625.5902709960938, 614.5786743164062, 700.7440185546875,
601.4874877929688, 652.834716796875, 645.3840942382812, 669.076416015625, 674.9522094726562,
635.4915161132812, 678.6888427734375, 593.9779663085938, 619.395751953125, 646.5572509765625,
668.3576049804688, 679.5086059570312, 663.1941528320312, 647.7777709960938, 675.7109375,
661.176513671875, 645.7769775390625, 621.56591796875, 630.021240234375, 588.1950073242188,
527.0238037109375, 562.8241577148438, 543.9931030273438, 526.936767578125, 516.940185546875,

$P_{T,\mu}$ distribution
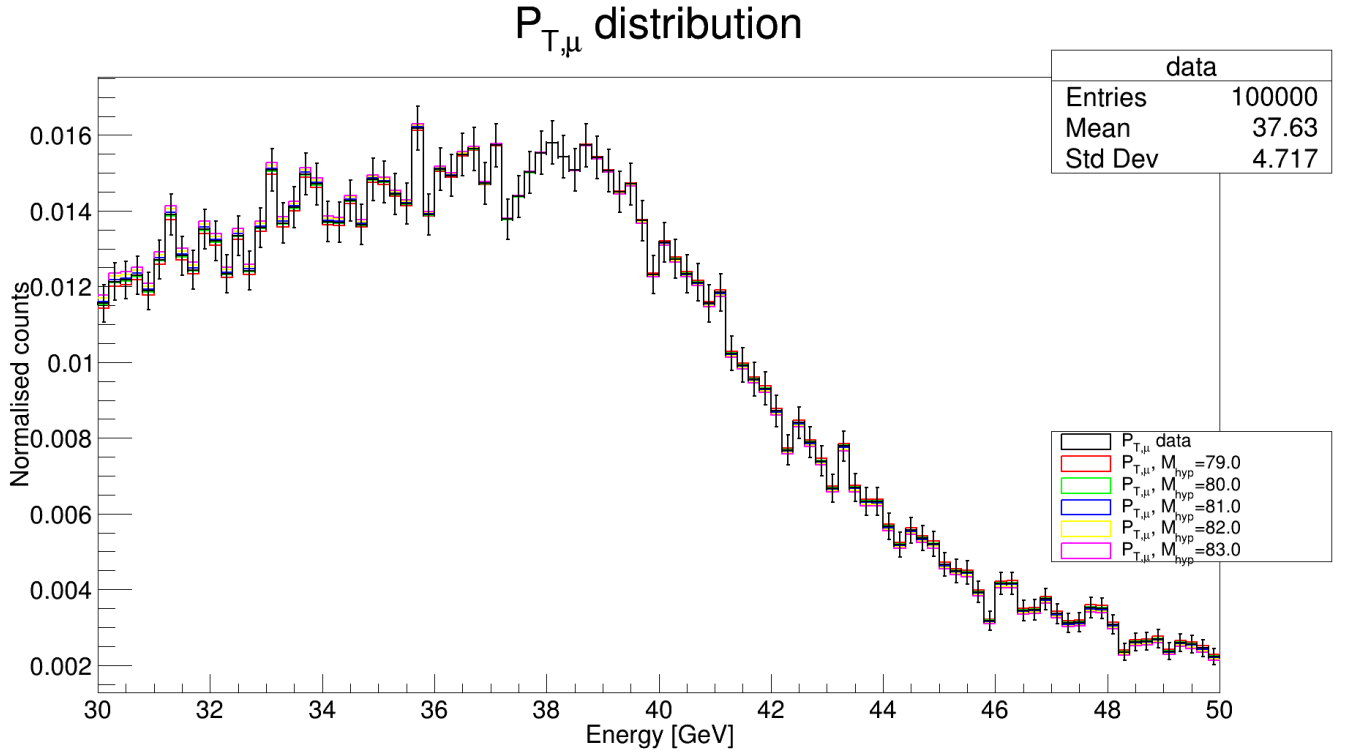
492.8952331542969, 504.87396240234375, 436.1026306152344, 422.66241455078125, 406.61196899414
395.83856201171875, 370.19805908203125, 326.2144775390625, 356.5797424316406, 334.49859619140
313.32470703125, 282.5713195800781, 329.43060302734375, 283.0344543457031, 267.17181396484375
266.9719543457031, 238.9674835205078, 218.814208984375, 234.26490783691406, 225.41656494140625
219.1773223876953, 195.63916015625, 188.5582275390625, 186.68519592285156, 164.94122314453125
132.88320922851562, 174.1493377685547, 174.00987243652344, 143.736328125, 144.46945190429688,
156.38246154785156, 139.92861938476562, 129.51158142089844, 130.2537384033203, 146.39973449701
145.41371154785156, 127.33122253417969, 97.33045196533203, 108.32679748535156, 109.0719833374
111.522705078125, 97.80387878417969, 107.04729461669922, 105.24005126953125, 100.8987350463862
91.47478485107422]

Found optimal massses (χ^2 roots): [80.44867128] $[GeV/c^2]$ Uncertainty [GeV/c^2] : 0.9339604544616549
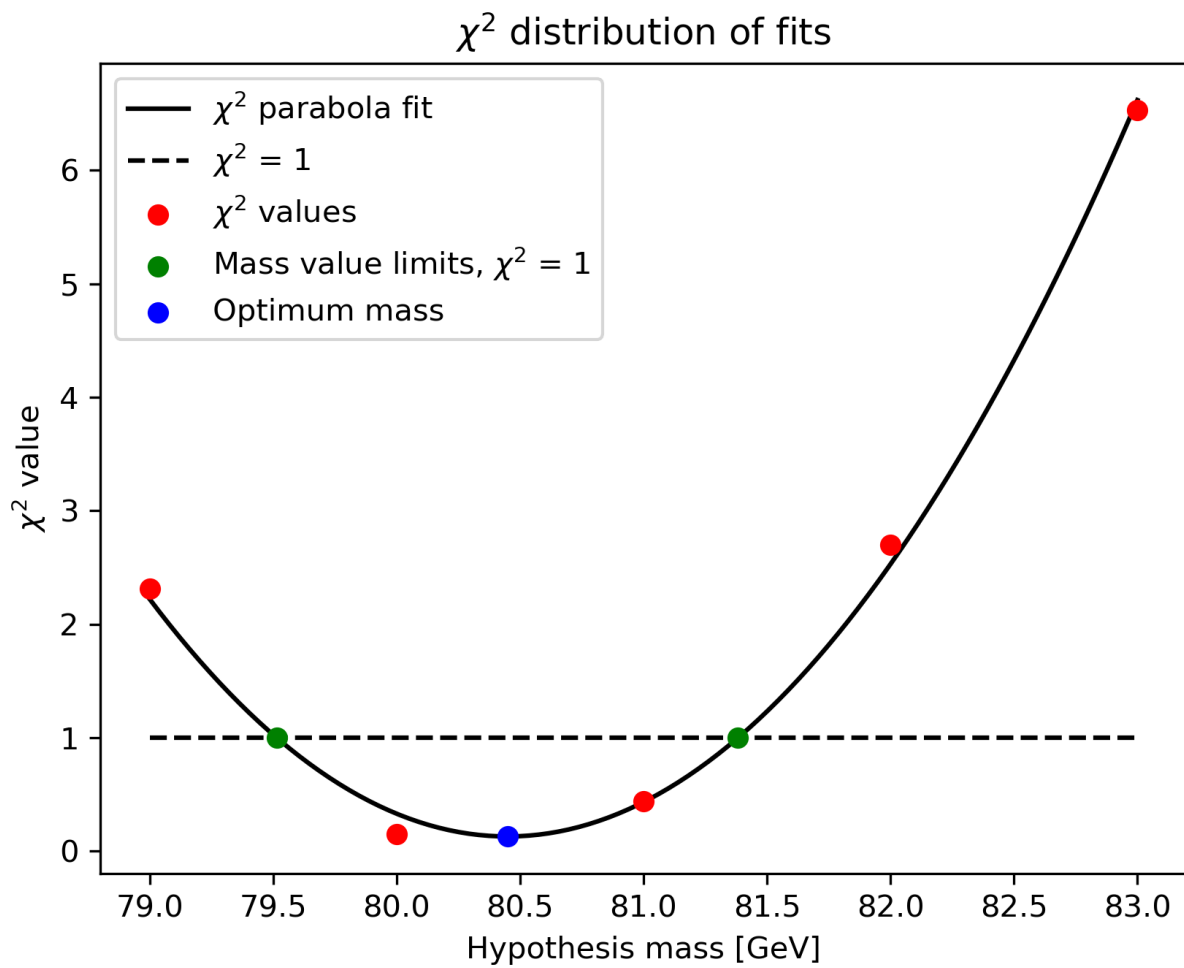
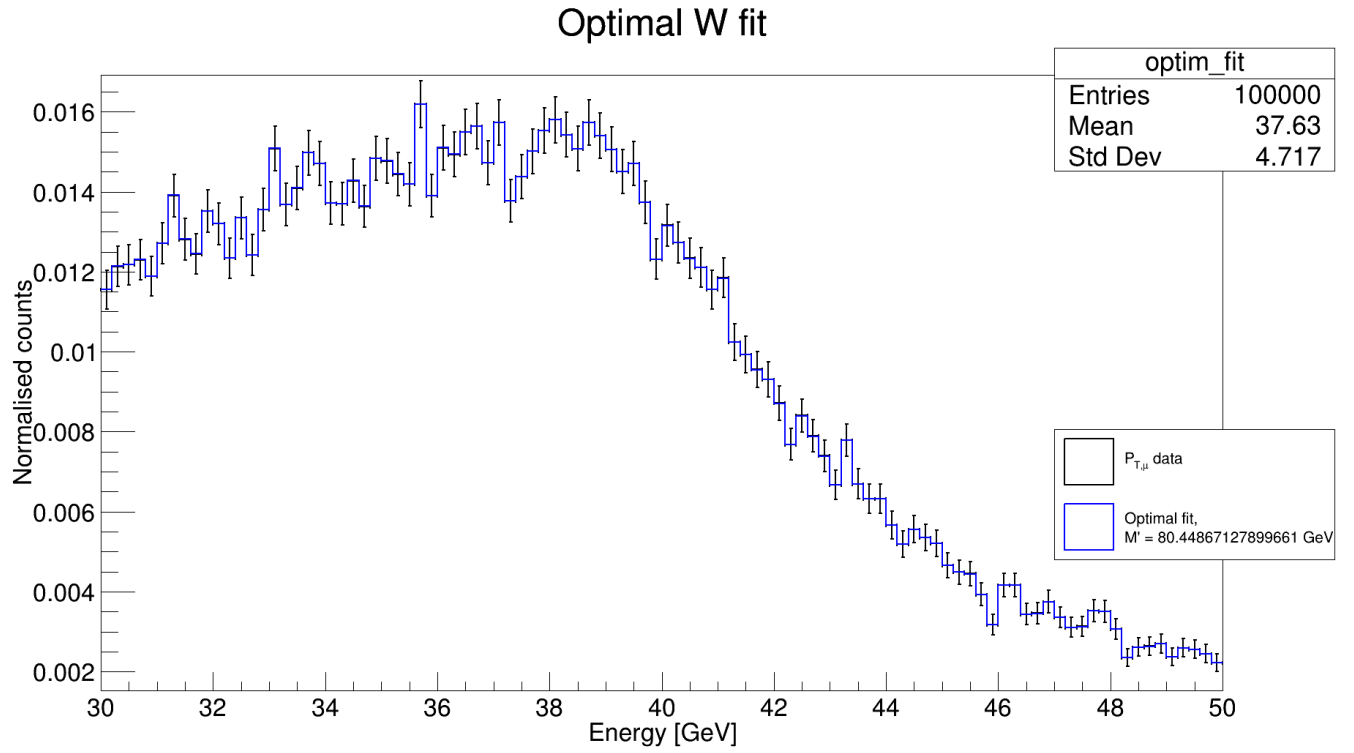Figure 2: χ^2 of hypothesis masses.

Figure 3: Data and optimum fit with $\chi^2 = 0.008796294003886106$. Used the hypothesis mass of 80.44867127899661 $[GeV/c^2]$.