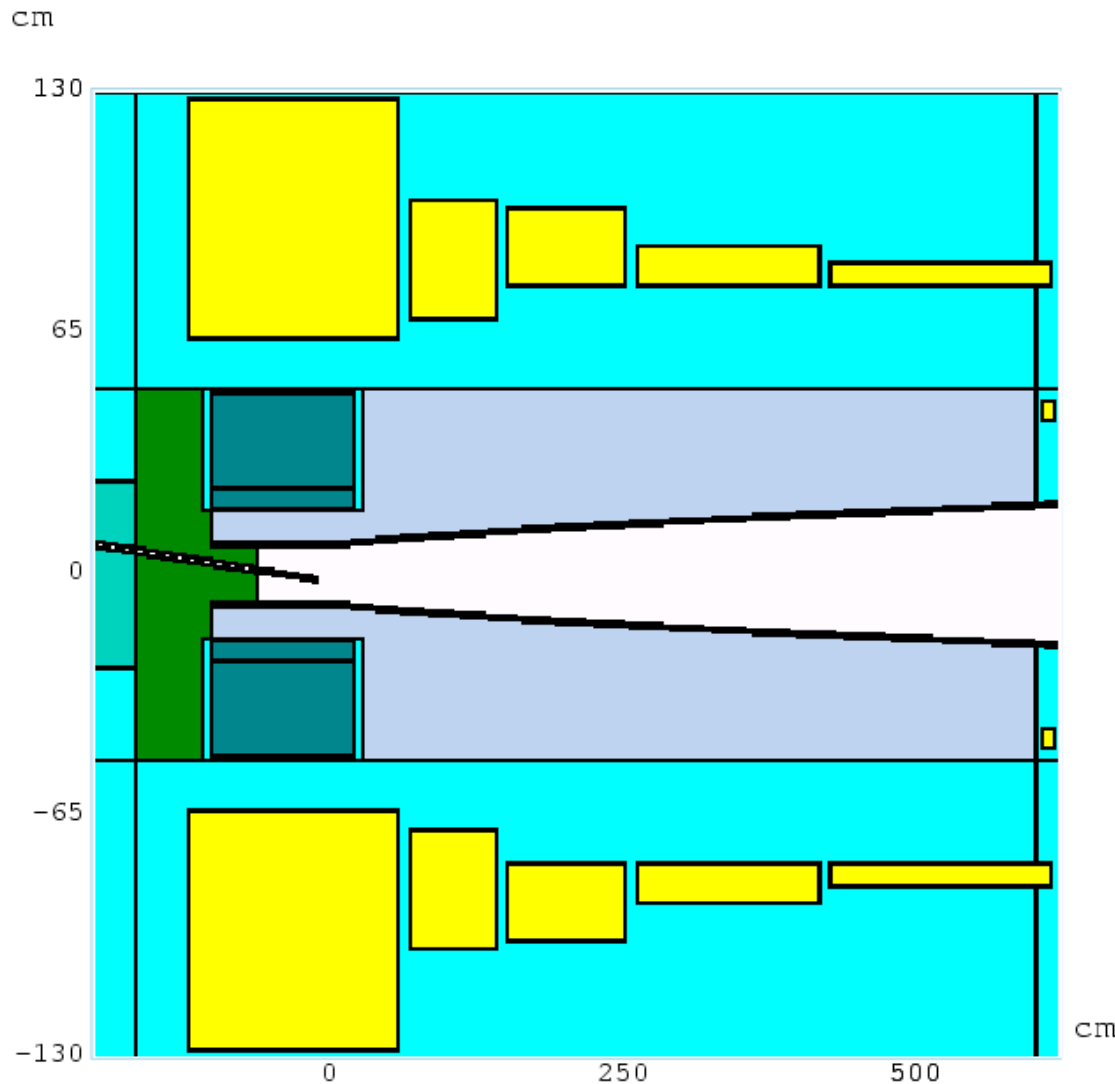


Optimization of Target Parameters for a Tungsten Target (Half Density) at 8GeV

X. Ding

Target Studies Nov. 2, 2010

Tungsten Geometry



5 mm of target
radius and 1.5 mm
beam

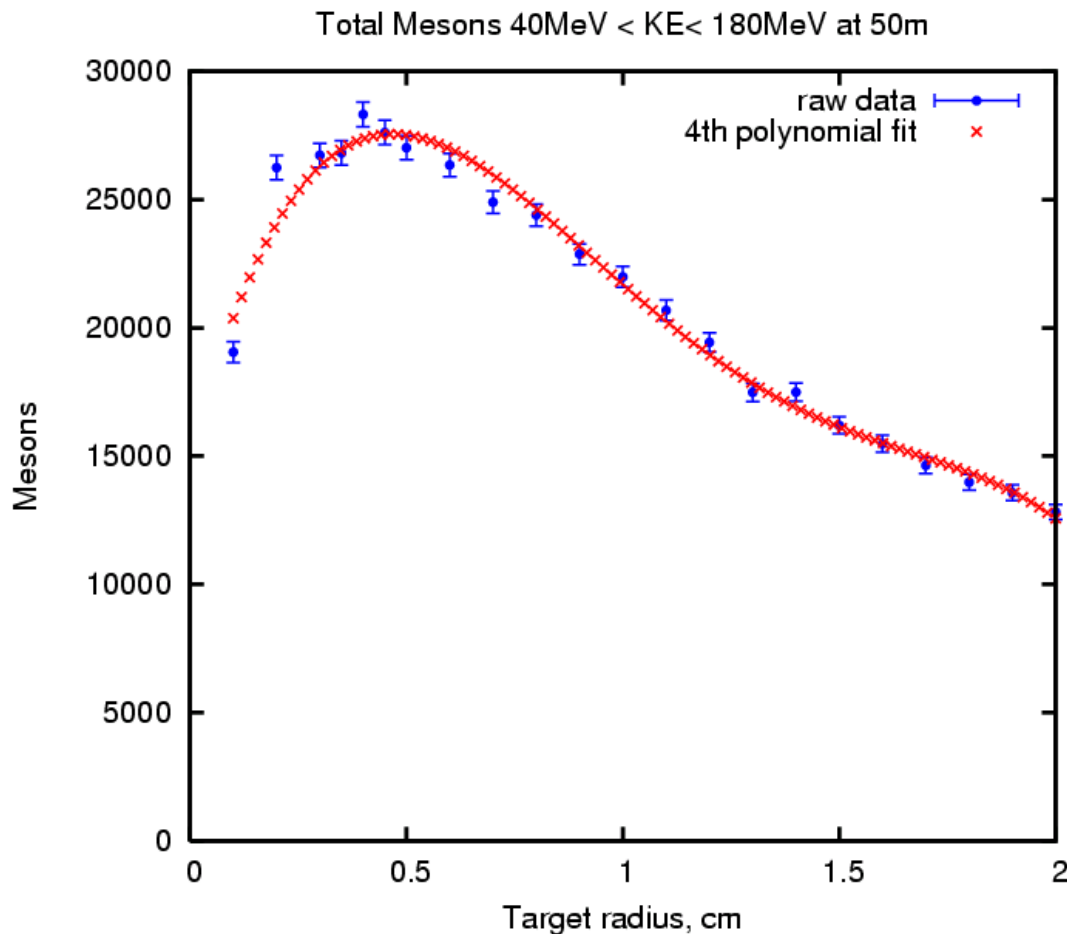
50mrad of beam
and tungsten to
sol. axis

50cm long of
tungsten in sol.
axis

Meson Productions at 8GeV

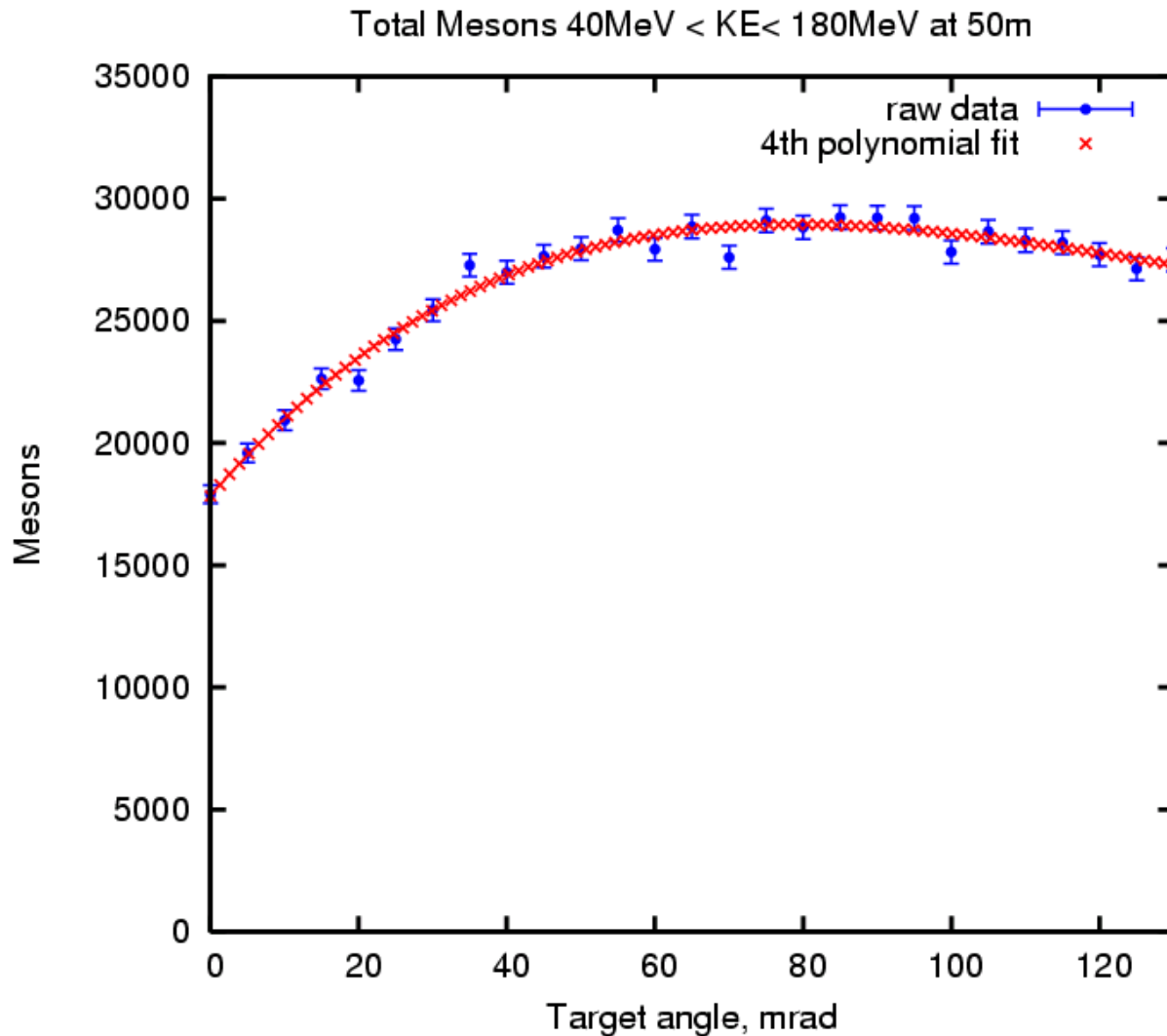
Target	50% W (9.65 g/cm ³) w/t optimization	Hg (13.54 g/cm ³) with optimization
Meson	27220 (pos: 13202 neg: 14018)	28819 (pos: 13613 neg: 15206)

Vary Target Radius



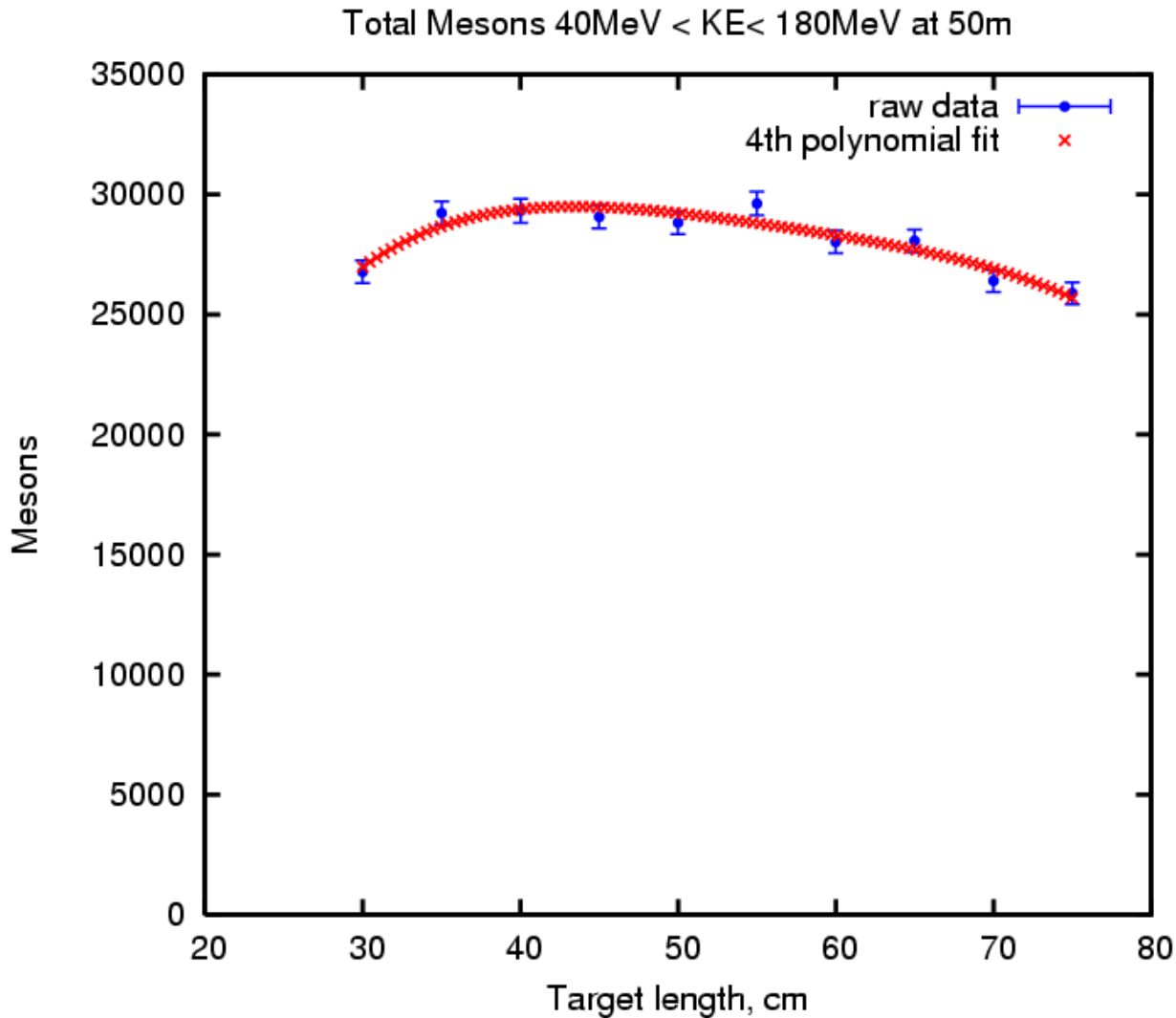
- Peak production efficiency at $r = 0.3 - 0.6\text{cm}$
- Efficiency reduction at $r = 1\text{cm}$ is 22%
- Fit: peak at 0.47cm

Vary Target Angle



- Target radius is 0.47 cm
- Fit: peak at 80 mrad

Vary Target Length



- Target radius is 0.47 cm and target angle is 80 mrad
- Fit: peak at 43.5 cm

Meson Productions at 8GeV

Target	50% W (9.65 g/cm ³) with optimization*	Hg (13.54 g/cm ³) with optimization
Meson	29069 (pos: 14099 neg: 14970)	28819 (pos: 13613 neg: 15206)

*Target radius: 0.47 cm, target angle: 80mrad, target length: 45cm

Backup

Raw Data (Vary Target Radius)

0.10 +1.9051308204697696e+04 +4.0675921385363870e+02
0.20 +2.6244251964556537e+04 +4.7049934225570684e+02
0.30 +2.6720345796458878e+04 +4.7342762688218352e+02
0.35 +2.6809543634150210e+04 +4.7142214416343791e+02
0.40 +2.8318254343710923e+04 +4.8063962904291191e+02
0.45 +2.7610951859924004e+04 +4.7117538642375763e+02
0.50 +2.7018588893249223e+04 +4.6363825705682638e+02
0.60 +2.6342749861347929e+04 +4.5497777299624454e+02
0.70 +2.4892595470274275e+04 +4.3843347059876282e+02
0.80 +2.4395734517073211e+04 +4.2927640204271614e+02
0.90 +2.2866832291146879e+04 +4.1324929521906148e+02
1.00 +2.1985271285316561e+04 +4.0378990799511712e+02
1.10 +2.0684427387140113e+04 +3.9027679773150203e+02
1.20 +1.9431981828233609e+04 +3.7527874310817634e+02
1.30 +1.7482705310627422e+04 +3.5511612366809402e+02
1.40 +1.7492885200300912e+04 +3.5078135797223820e+02
1.50 +1.6202213733459603e+04 +3.3530536668247083e+02
1.60 +1.5481202456865356e+04 +3.2989443120422550e+02
1.70 +1.4641201941274216e+04 +3.1590001449518934e+02
1.80 +1.3985384742959059e+04 +3.1143360581123756e+02
1.90 +1.3573014187427429e+04 +3.0214857328635702e+02
2.00 +1.2819786324995026e+04 +2.9247382033297220e+02

Raw Data (Vary Target Angle)

0 +1.7903833510491600e+04 +3.7271731702497965e+02
5 +1.9588797935633967e+04 +3.9380773316714760e+02
10 +2.0929566937308231e+04 +4.0775184925502106e+02
15 +2.2630666111110007e+04 +4.2102612807143868e+02
20 +2.2554604471242623e+04 +4.2310711889510105e+02
25 +2.4250984295232527e+04 +4.3910721280971410e+02
30 +2.5440621576992729e+04 +4.5115074246509613e+02
35 +2.7278461800029163e+04 +4.6850728365167248e+02
40 +2.6986041054579735e+04 +4.6590036262652933e+02
45 +2.7650171065933093e+04 +4.7250737675394305e+02
50 +2.7959789862012502e+04 +4.7457787771270330e+02
55 +2.8710199462933200e+04 +4.8180159529824959e+02
60 +2.7928576284938164e+04 +4.7602103660930925e+02
65 +2.8852732581988355e+04 +4.8311201454616975e+02
70 +2.7599356305772020e+04 +4.7131258135587751e+02
75 +2.9105800132488446e+04 +4.8552236102396631e+02
80 +2.8823794285158245e+04 +4.8287360112382447e+02
85 +2.9238467765421407e+04 +4.8809481166329124e+02
90 +2.9221624692394740e+04 +4.8670833336381145e+02
95 +2.9200929628766560e+04 +4.8546648109860865e+02
100 +2.7814853018678856e+04 +4.7385979074008310e+02
105 +2.8655228611267110e+04 +4.8498267850896332e+02
110 +2.8300476576053970e+04 +4.7792621945778461e+02
115 +2.8207027337217718e+04 +4.7908546967290346e+02
120 +2.7711342376946312e+04 +4.7559422327494792e+02
125 +2.7134151414544187e+04 +4.7046471137745107e+02
130 +2.7495108412441594e+04 +4.7329256709375147e+02

Raw Data (Vary Target Length)

30 +2.6776520401947851e+04 +4.6848655474883526e+02
35 +2.9226036940748738e+04 +4.9107554623199746e+02
40 +2.9317531528362928e+04 +4.8904601436886389e+02
45 +2.9068414538707635e+04 +4.8465311076024017e+02
50 +2.8823794285158245e+04 +4.8287360112382447e+02
55 +2.9624250066629567e+04 +4.8901782987973633e+02
60 +2.8021820455896042e+04 +4.7550869504144890e+02
65 +2.8066830174917141e+04 +4.7817923250936587e+02
70 +2.6396185962845753e+04 +4.6149806867197043e+02
75 +2.5885000036421257e+04 +4.5837320551184115e+02