E02-013 Analysis Update

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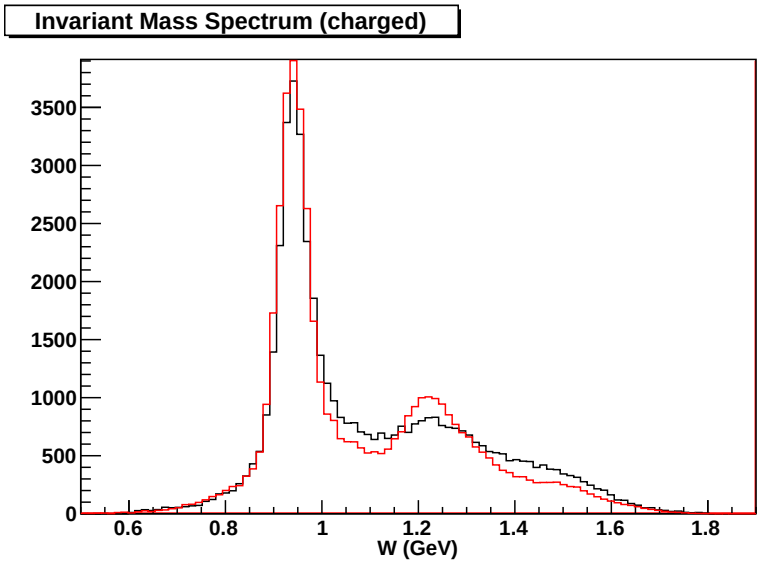
July 22, 2008

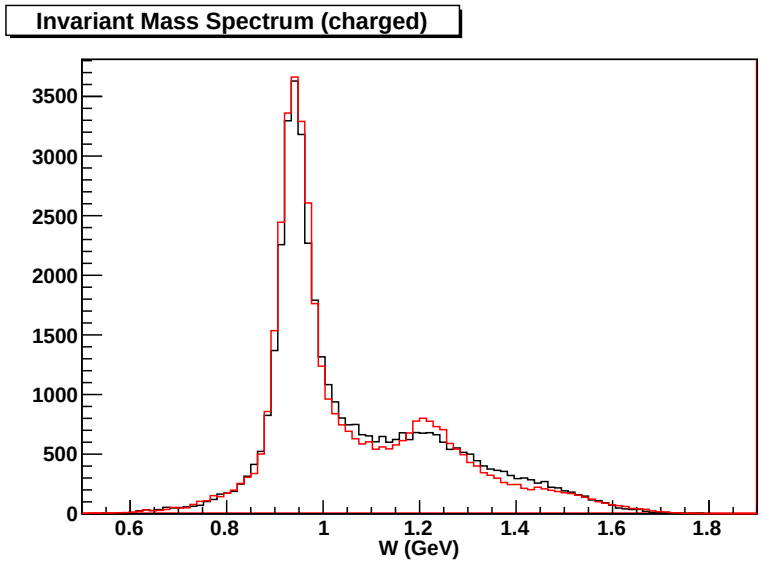
Overview

- SPIN08 abstract in this directory - will send to Hall A CC at end of week (submission deadline Aug 1)
- Continuing MC
  - Included external radiative corrections
  - Downloaded π production asymmetry data from MAID
  - Background still needs to be subtracted when comparing to data
- First looks at FSI code
- Spent some time on track χ^2 minimization

External Radiative Correction Effects



Without



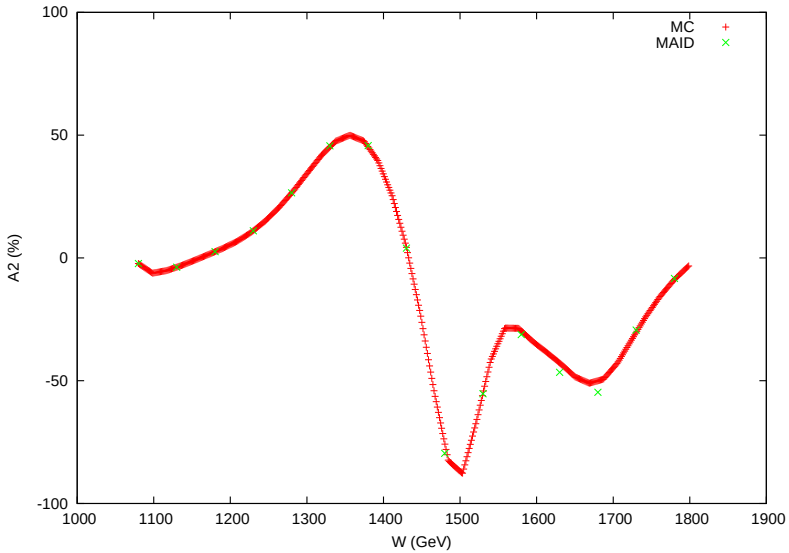
With

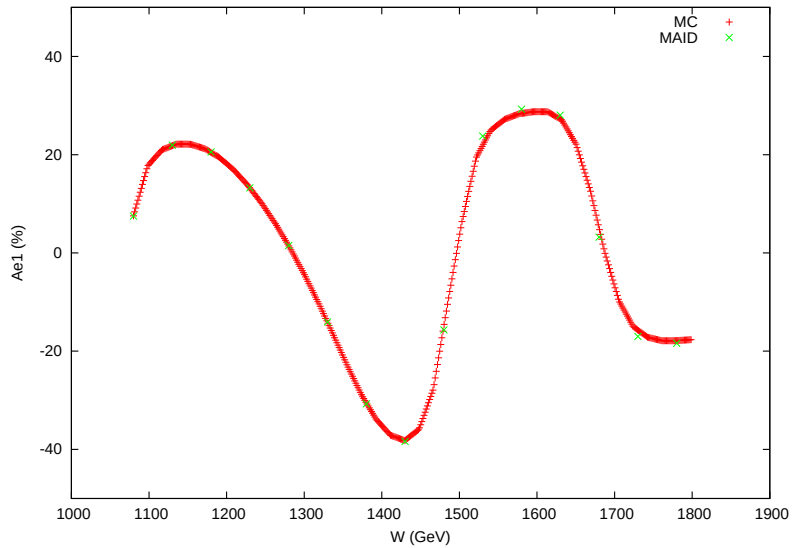
- Black is data, red is simulation
- Still missing Be window material
- Should to check against other known distributions (MCEEP?)

Elastic and Pion Production Asymmetry

- Data sampling was coarse to meet reasonable memory requirements
- $\epsilon \sim 0.1$, $Q^2 \sim 0.5\ \mathrm{GeV}^2$, $\Theta_\pi \sim 10^\circ$, $\Phi_\pi \sim 10^\circ$, $W \sim 20\ \mathrm{MeV}$
- 4 50 MB files of data - 1 GB memory runtime for lookup tables
- Elastic asymmetry requires good G_E, G_M curves, need to settle on fit with our data

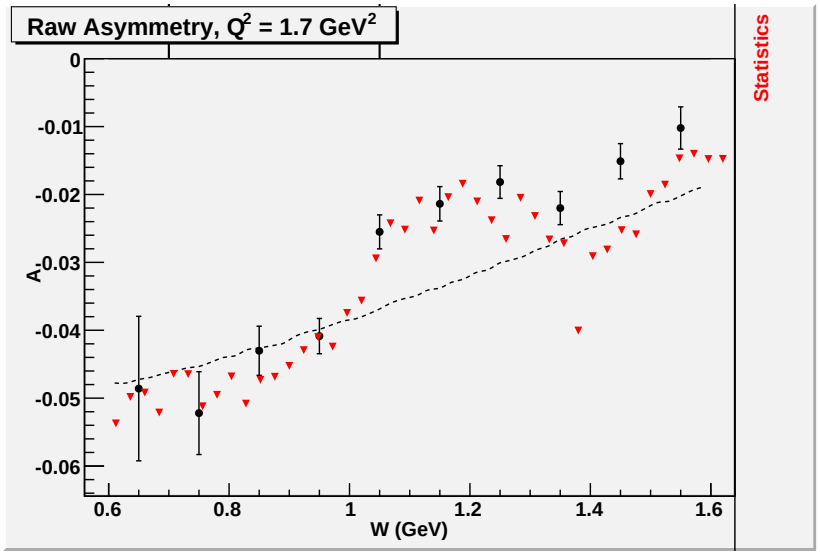
- Comparing one case of interpolation and direct MAID results:

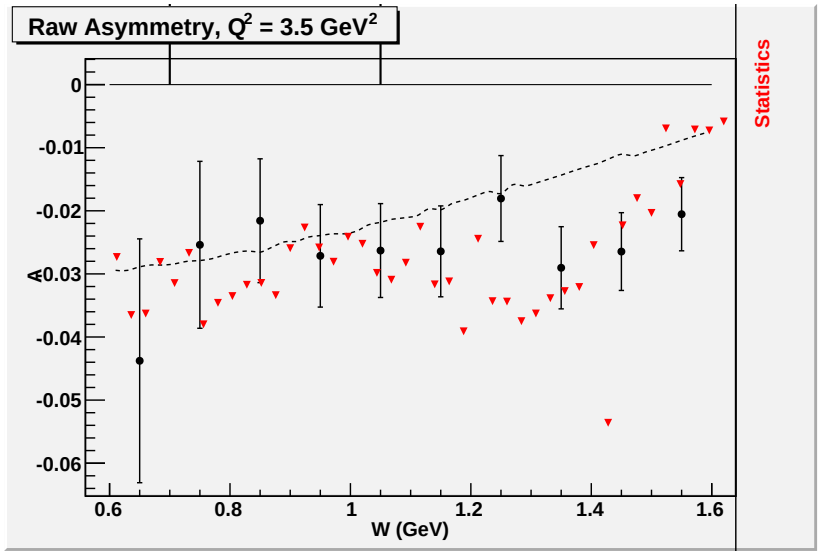




- Need to extensively test quality of interpolation
- Spot checks suggest probably have to do
- 2nd order splines may provide better solution

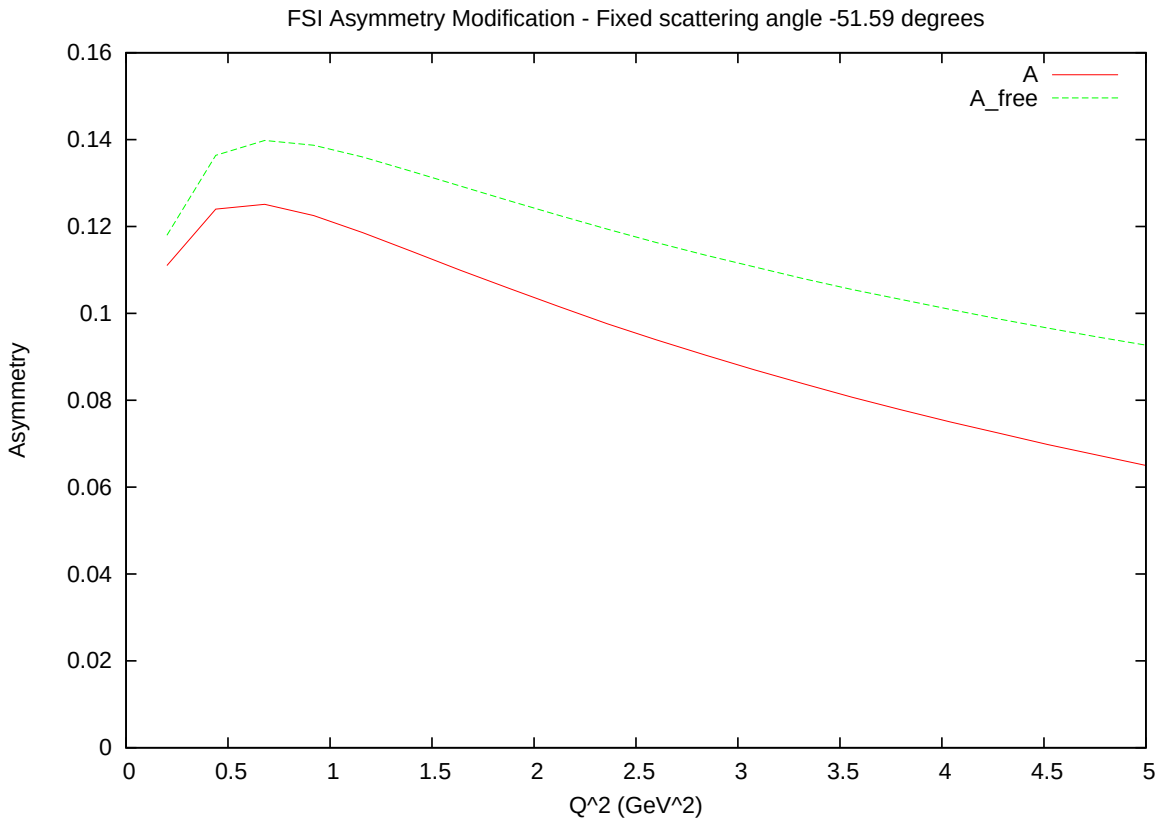
- Plugging in, scaling to match, and comparing to data:





- Black dots data, red dots MC
- Still needs work, more statistics, and checks but agreement is looking reasonable

- Started looking at FSI code from Sargsian
- Scanned over Q^2 using fixed e' angle of $-51.59°$:

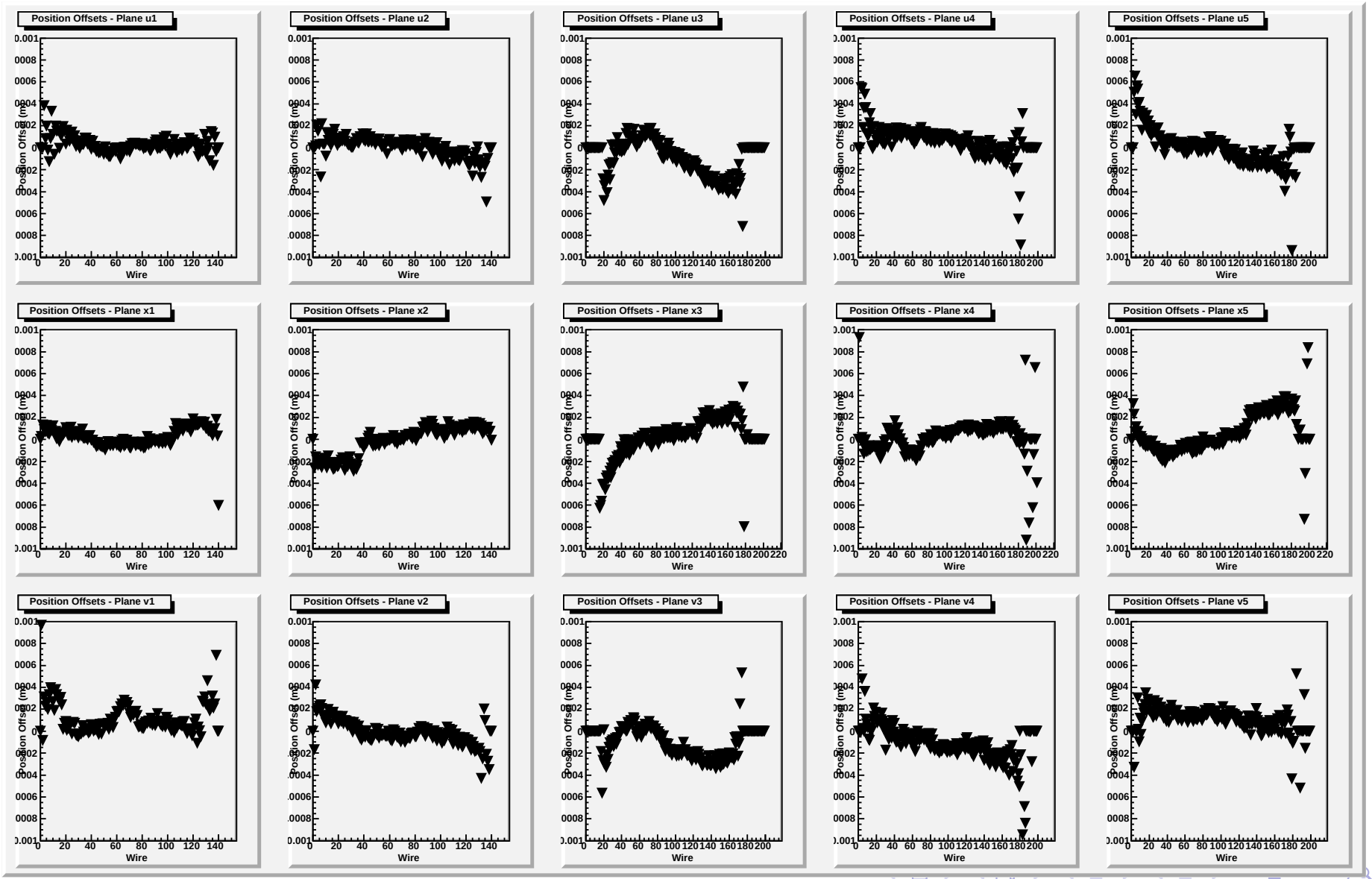


- Asymmetries seem small ($A_{Q^2=1.7\ \mathrm{GeV}^2} = 25\%$ in data)
- Polarization angle at 90°, not sure coordinate system
- Gives large asymmetry drop due to FSI!

Minimizing χ^2 TDC and Position Offsets

- Erik optimizing TDC and wire position offsets using χ^2
- TDC offsets generally stable ($\sim< 5\mathrm{ns}$ difference)
- Lots of structure in drift chamber wire positions
- Need to optimize geometry θ_{plane}, z_{plane} - code recently written
- Need to study over long periods of time
- Need to use this method to optimize TTD parameters

Position Offsets



Residual Width (σ) Improvements

Plane	Unopt. (μm)	Opt. (μm)	δ_σ/σ
U1	211.97	182.06	0.14
U2	206.52	180.40	0.13
X1	236.85	197.44	0.17
X2	250.62	200.69	0.20
V1	230.00	194.60	0.15
V2	227.75	192.71	0.15
U3	284.82	248.27	0.13
X3	304.95	277.79	0.09
V3	292.98	261.44	0.11
U4	223.58	194.40	0.13
U5	229.04	212.54	0.07
X4	245.59	214.32	0.13
X5	265.66	211.59	0.20
V4	271.03	215.10	0.21
V5	262.87	214.99	0.18