E02-013 Analysis Update

Seamus Riordan

November 4, 2009

This Week

- Putting together writeup
- Analysis
  - Finalized beam polarization analysis
  - Results very close to final
- Monte Carlo
  - Monte Carlo Systematic Error
  - Kin 3 MC issues

Beam Polarization Numbers

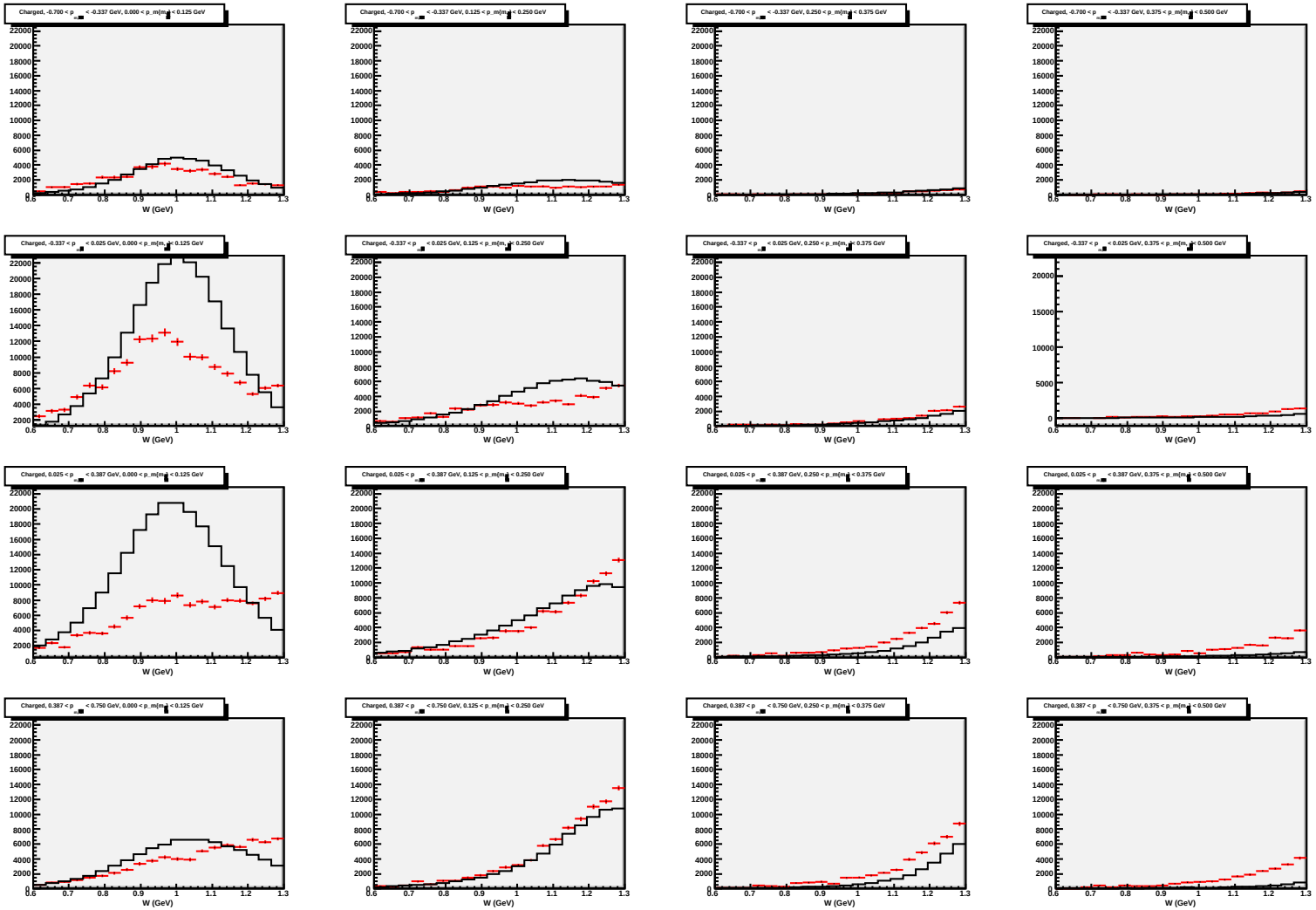
- Alex says Compton systematic to use is 3%
- Set Mott to 3% systematic (as 1% before)

Kin	pol	err
2	0.850	0.021
3	0.829	0.017
4	0.852	0.030

- RMS of all kin 3 measurements is 0.022

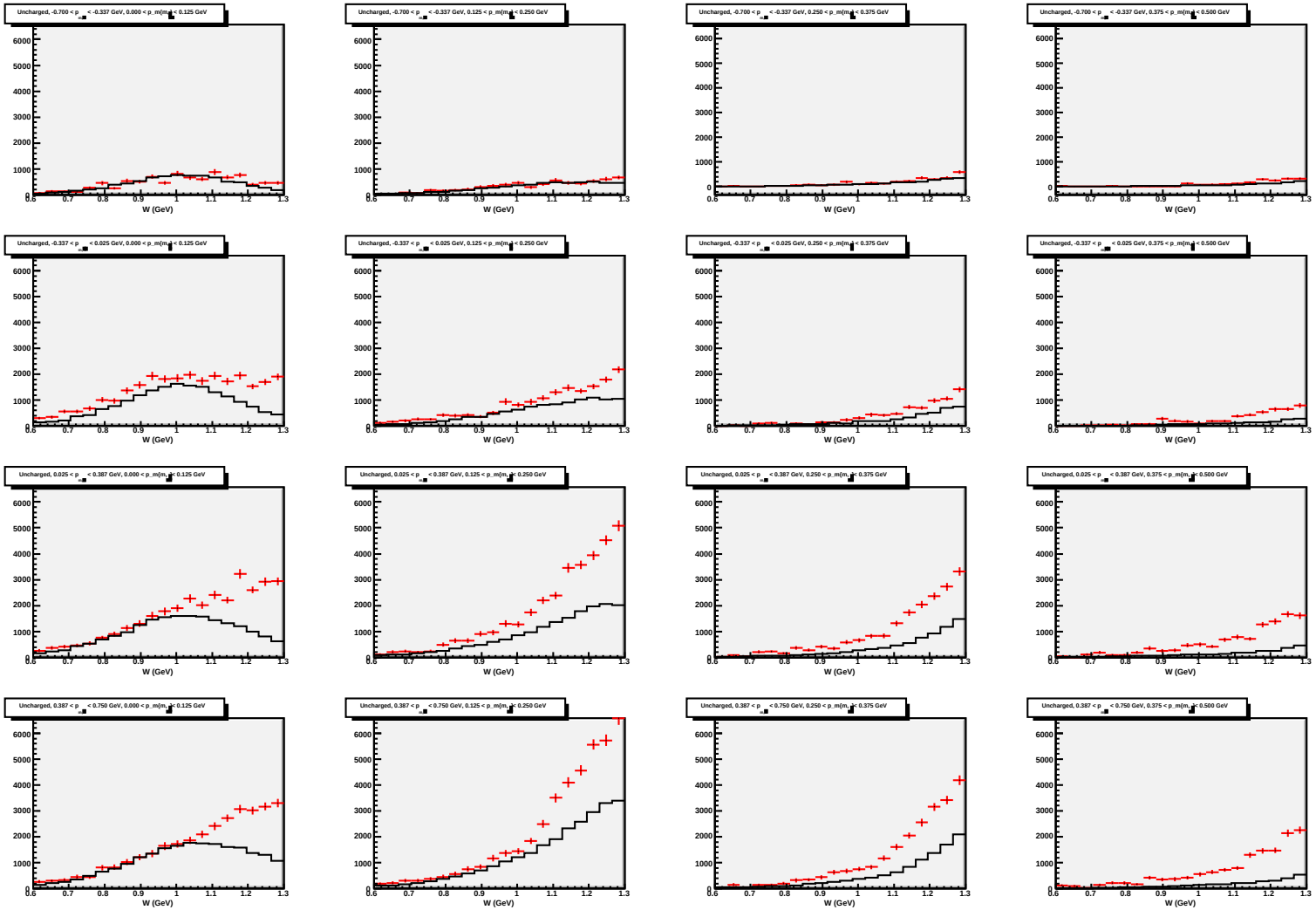
Kin 3 Monte Carlo

Charged Kin 3 monte carlo looks really ugly



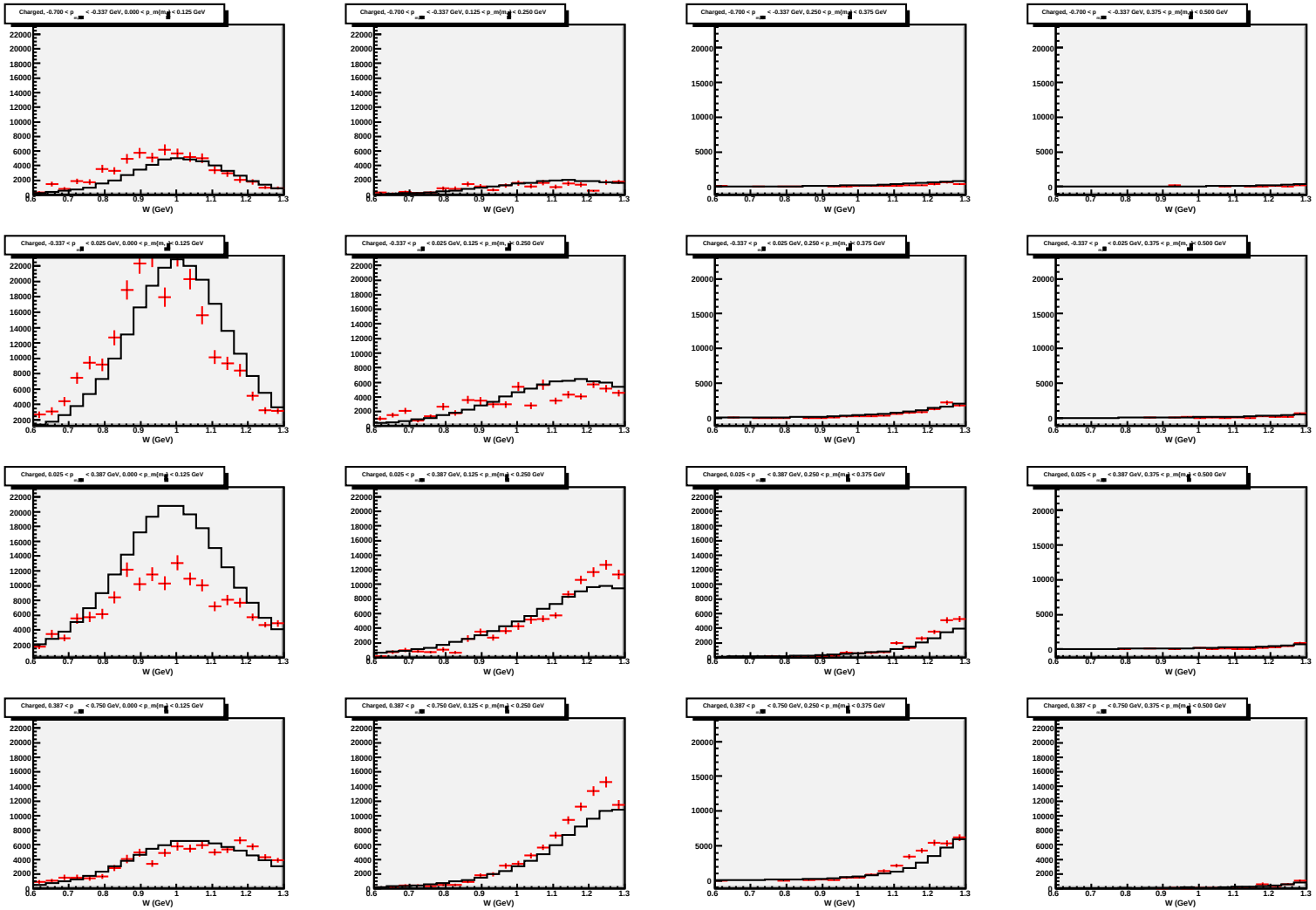
Kin 3 Monte Carlo

Uncharged



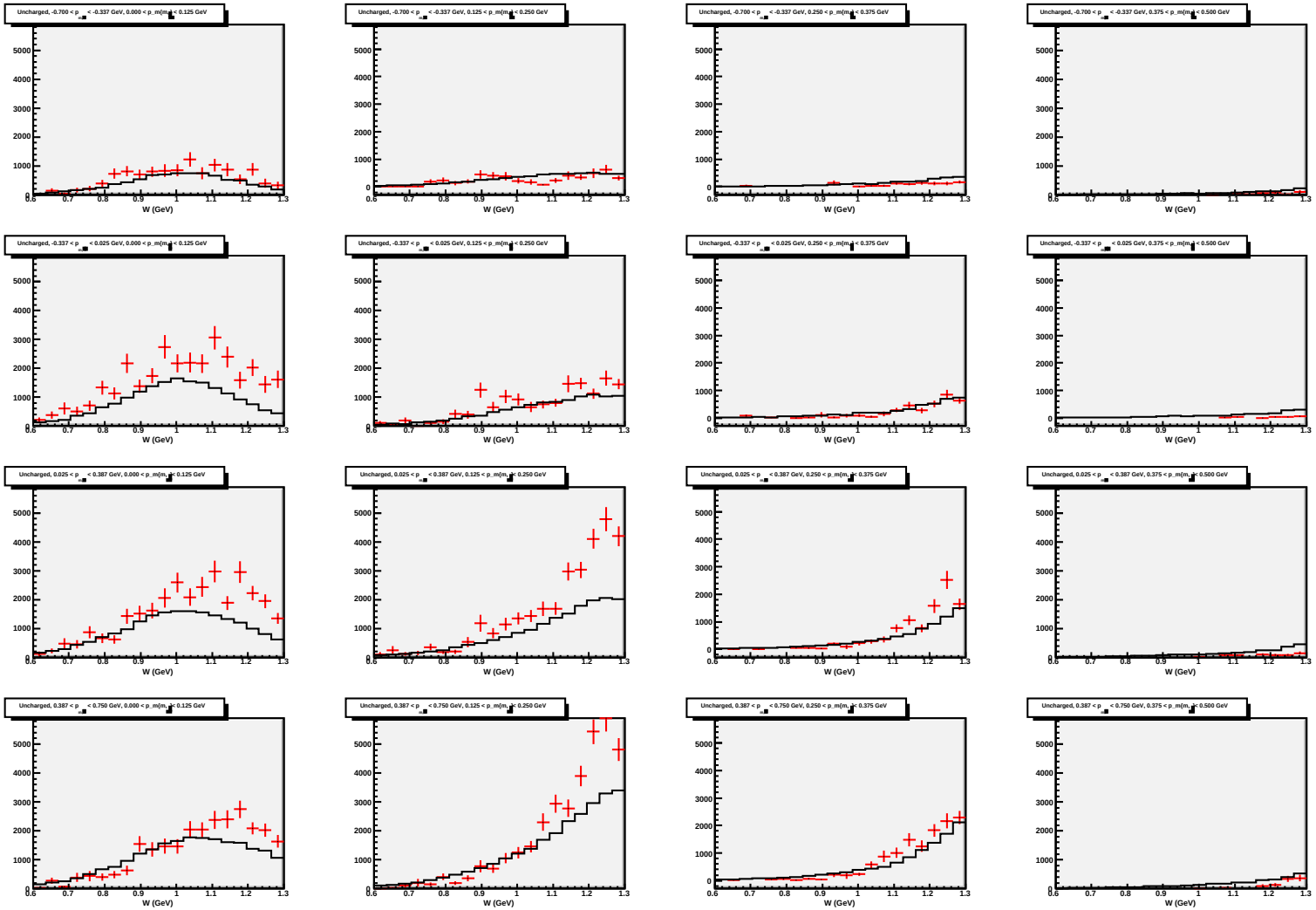
Kin 3 Monte Carlo

Turning off uncorrelated planes (vetos still on)



Kin 3 Monte Carlo

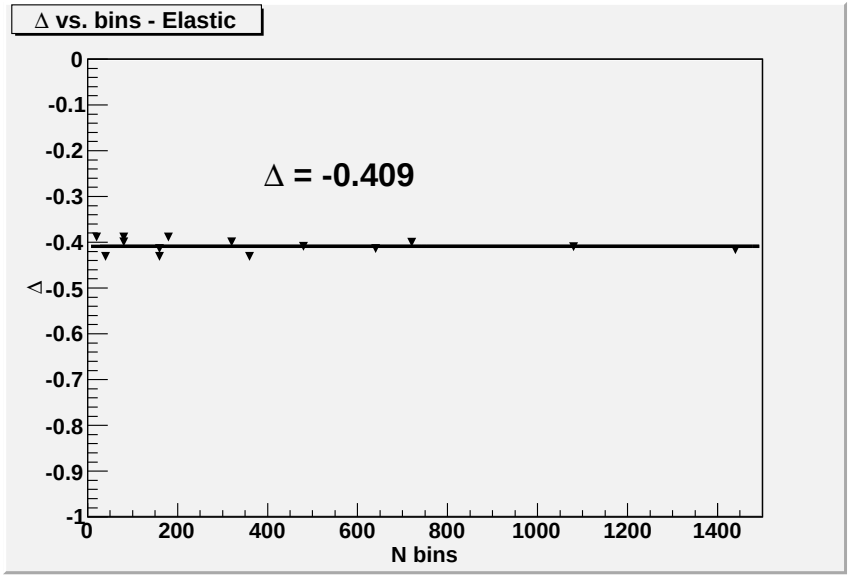
Uncharged

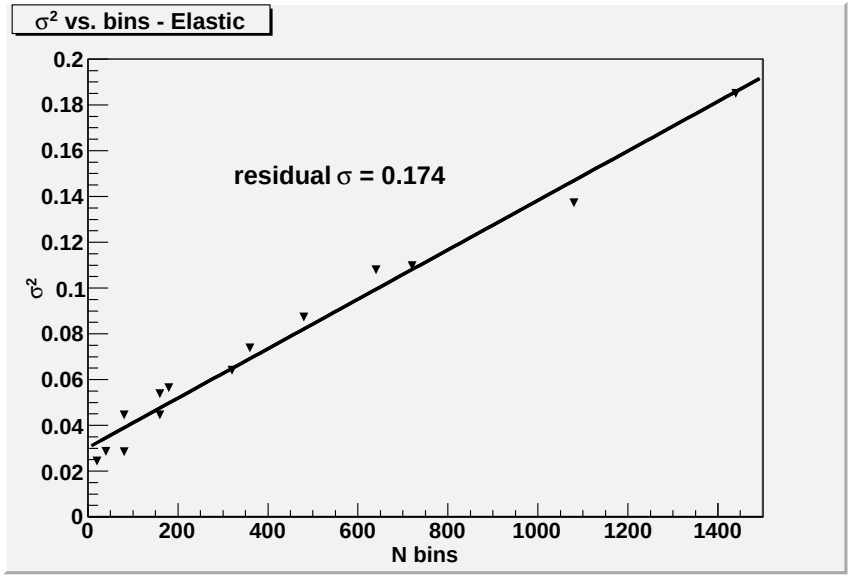


Monte Carlo Error

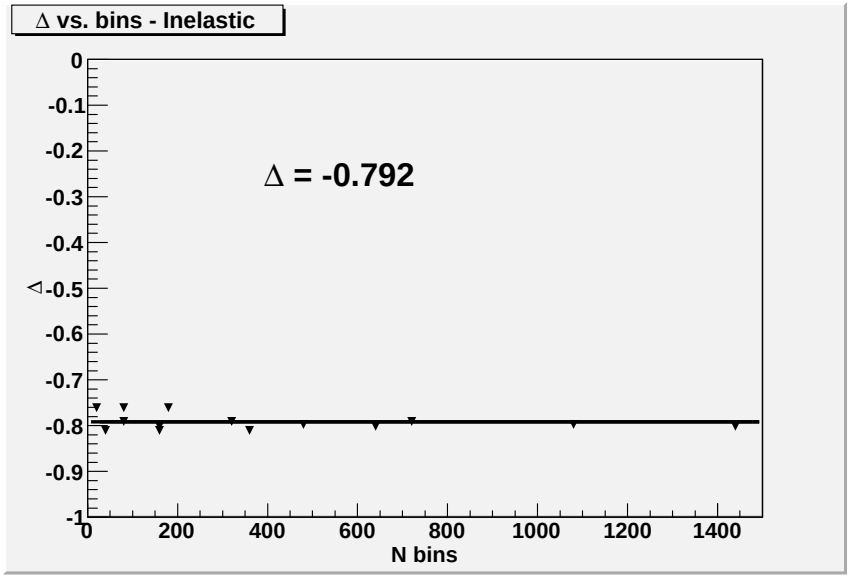
- Separate W into two regions
  - Elastic, $0.7 < W < 1.1\ \mathrm{GeV}$
  - Inelastic, $0.7 < W < 1.1\ \mathrm{GeV}$
- Cuts on $0 < p_{\mathrm{miss},\perp} < 0.15\ \mathrm{GeV}$
- Cuts on $-0.4 < p_{\mathrm{miss},\parallel} < 0.4\ \mathrm{GeV}$
- Normalize MC to total events in cuts
- Look at bin differences (removing statistical error) for uncharged elastic and inelastic separately
- Vary binning and look how differences vary

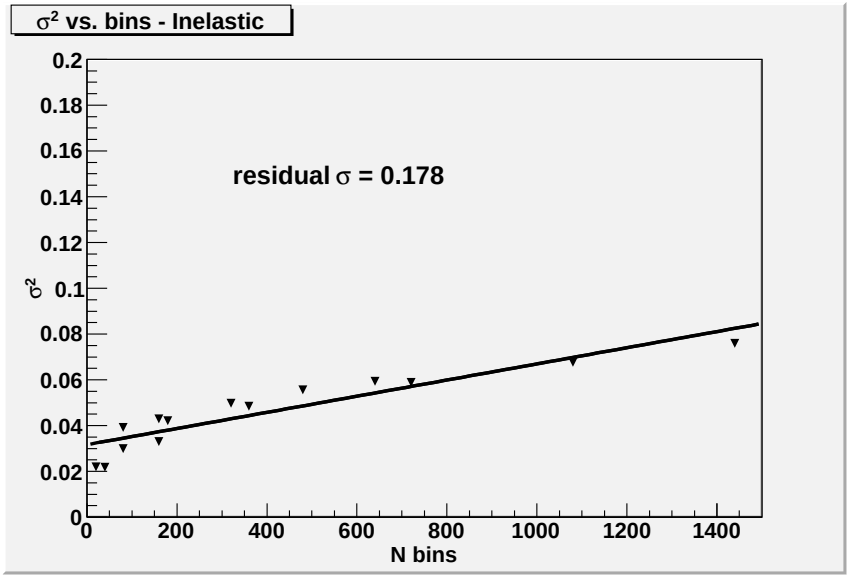
Monte Carlo Error - Elastic



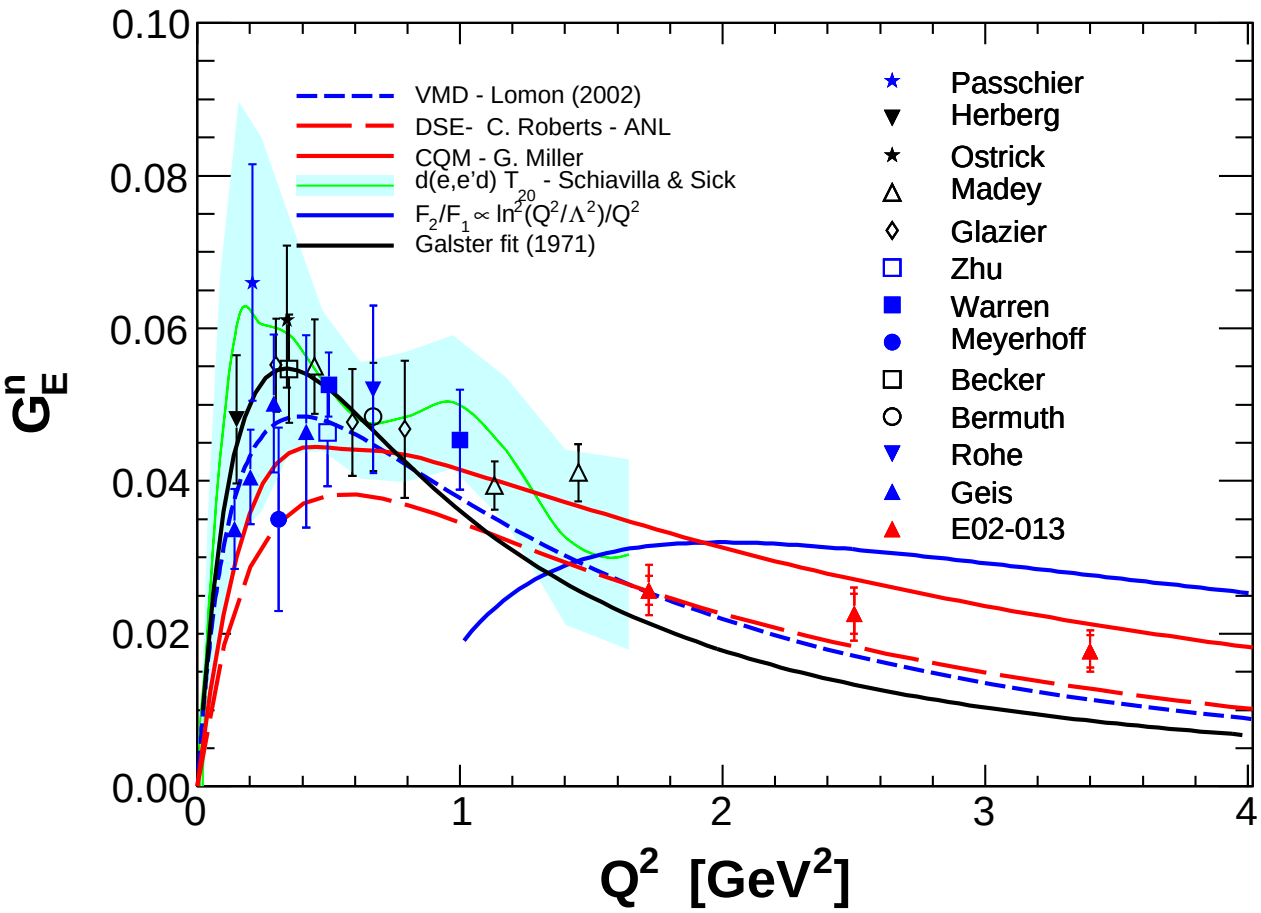


Monte Carlo Error - Inelastic



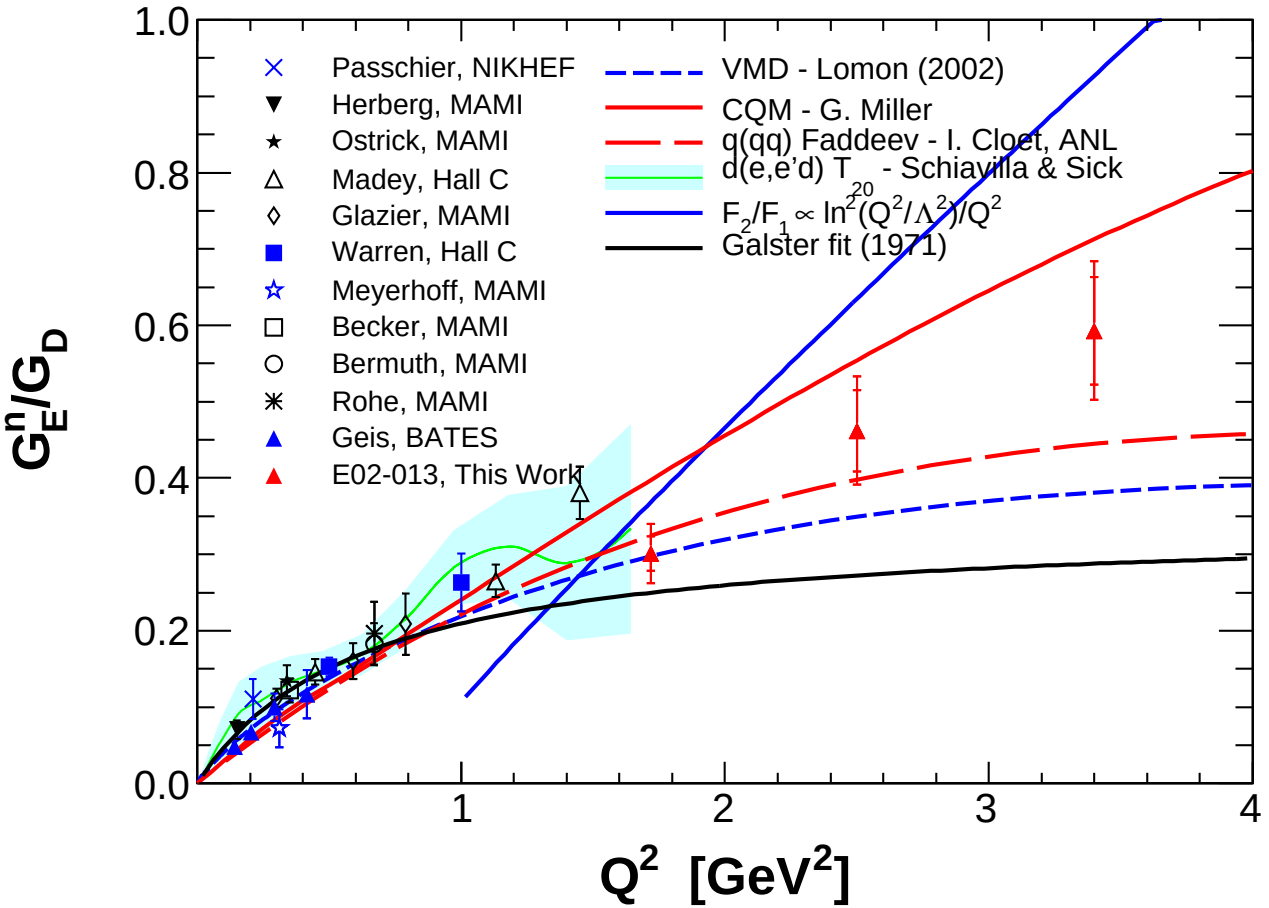


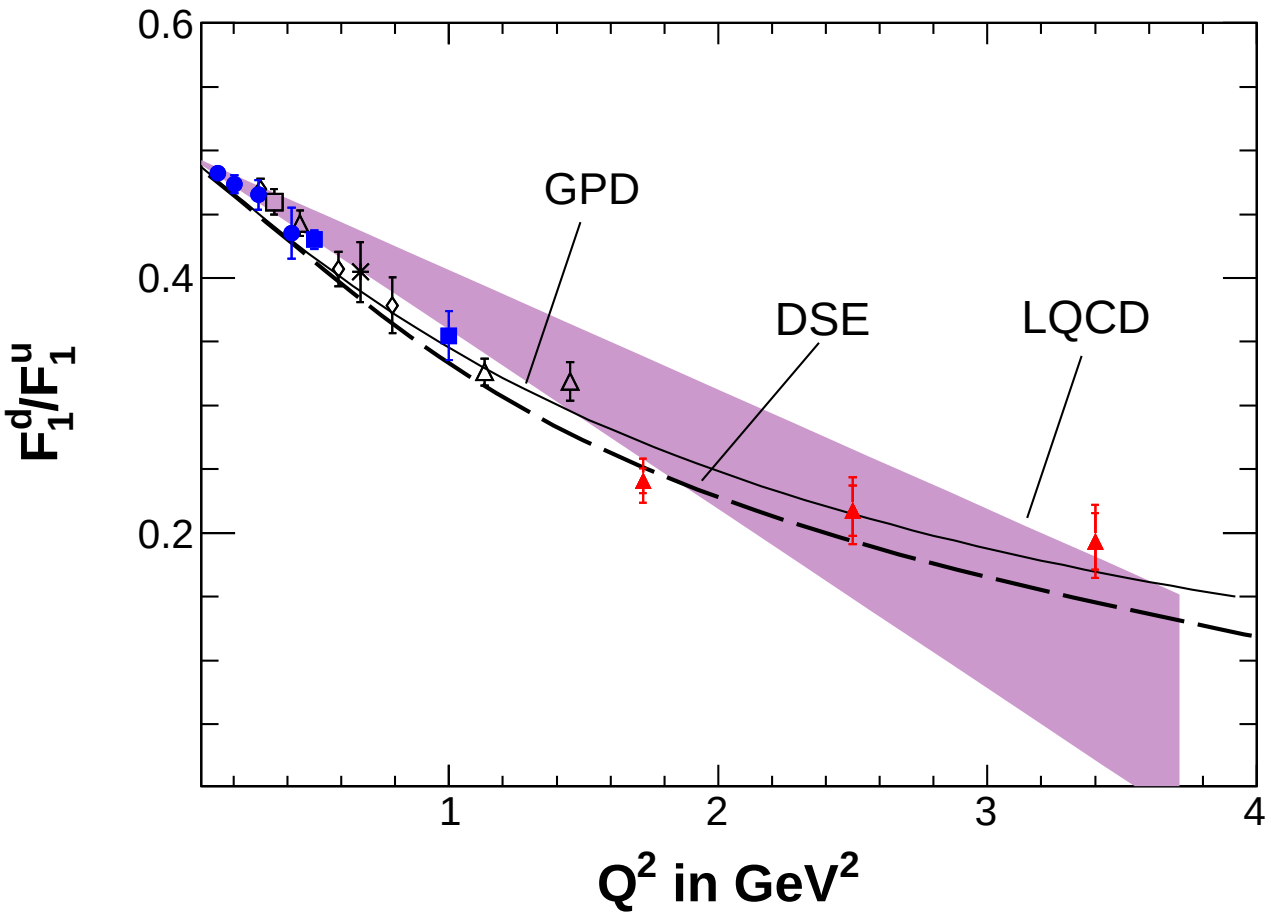
- Reduced inelastic compared to elastic makes $D_{\text{in}} \sim 0.90$

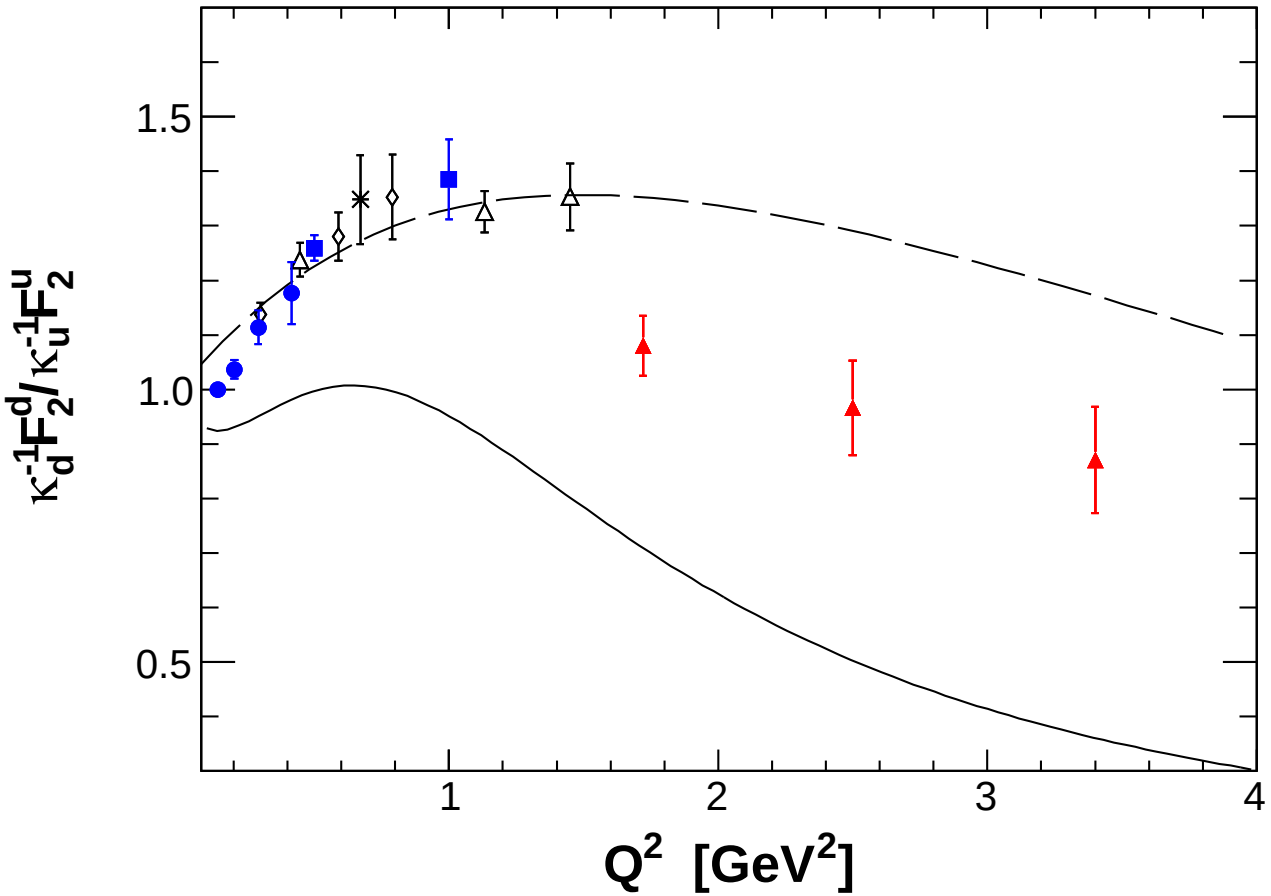

VMD - Lomon (2002)
DSE- C. Roberts - ANL
CQM - G. Miller
d(e,e'd) T_{20} - Schiavilla & Sick
$F_2/F_1 \propto \ln^2(Q^2/\Lambda^2)/Q^2$
Galster fit (1971)
Passchier
Herberg
Ostrick
Madey
Glazier
Zhu
Warren
Meyerhoff
Becker
Bermuth
Rohe
Geis
E02-013
G_E^n
Q^2 [GeV^2]
0.00
0.02
0.04
0.06
0.08
0.10
0
1
2
3
4

Kin	Prop. Err	Present Error
1/4	12.8%	13.8%
2	15.4%	18.1%
3	17.6%	15.2%

- Preliminary kin 3 error was 25%
- “Bad case” MC error (sent earlier this week) was 17.5%


Passchier, NIKHEF
Herberg, MAMI
Ostrick, MAMI
Madey, Hall C
Glazier, MAMI
Warren, Hall C
Meyerhoff, MAMI
Becker, MAMI
Bermuth, MAMI
Rohe, MAMI
Geis, BATES
E02-013, This Work
VMD - Lomon (2002)
CQM - G. Miller
q(qq) Faddeev - I. Cloet, ANL
d(e,e'd) T20 - Schiavilla & Sick
F2/F1 ∝ ln2(Q2/Λ2)/Q2
Galster fit (1971)
GEn/GD
Q2 [GeV2]
0.0
0.2
0.4
0.6
0.8
1.0
1
2
3
4


0.6
0.4
0.2
F_1^d/F_1^u
GPD
DSE
LQCD
1
2
3
4
Q^2 in GeV^2



Dashed curve is Diehl GPD

To Do

- Still missing angular resolution error
- Look at no background MC - see if it makes a difference
- Error minimization
- Put together writeup