

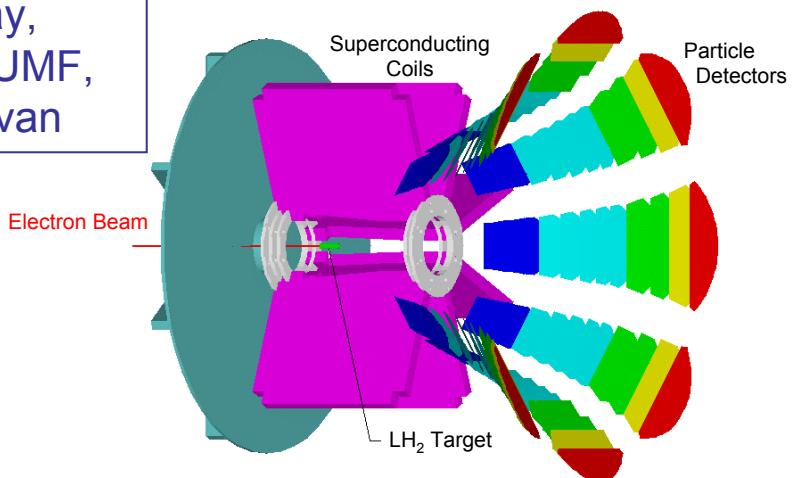


GO Experiment



Caltech, Carnegie Mellon, W&M, Hampton, IPN-Orsay,
LPSC-Grenoble, Kentucky, La. Tech, NMSU, JLab, TRIUMF,
UConn, UIUC, UMan, UMd, UMass, UNBC, VPI, Yerevan

- Measure weak neutral current analogs of G_E , G_M
 - different linear combination of u, d and s contributions than e.m. form factors
→ strange quark contributions to sea
- Measure forward and backward asymmetries
 - recoil protons for forward measurement
 - electrons for backward measurements
 - elastic/inelastic for 1H , elastic for 2H
- Forward angle measurements complete



$$E_{\text{beam}} = 3 \text{ GeV}$$
$$0.33 - 0.93 \text{ GeV}$$

$$I_{\text{beam}} = 40 \mu\text{A}$$

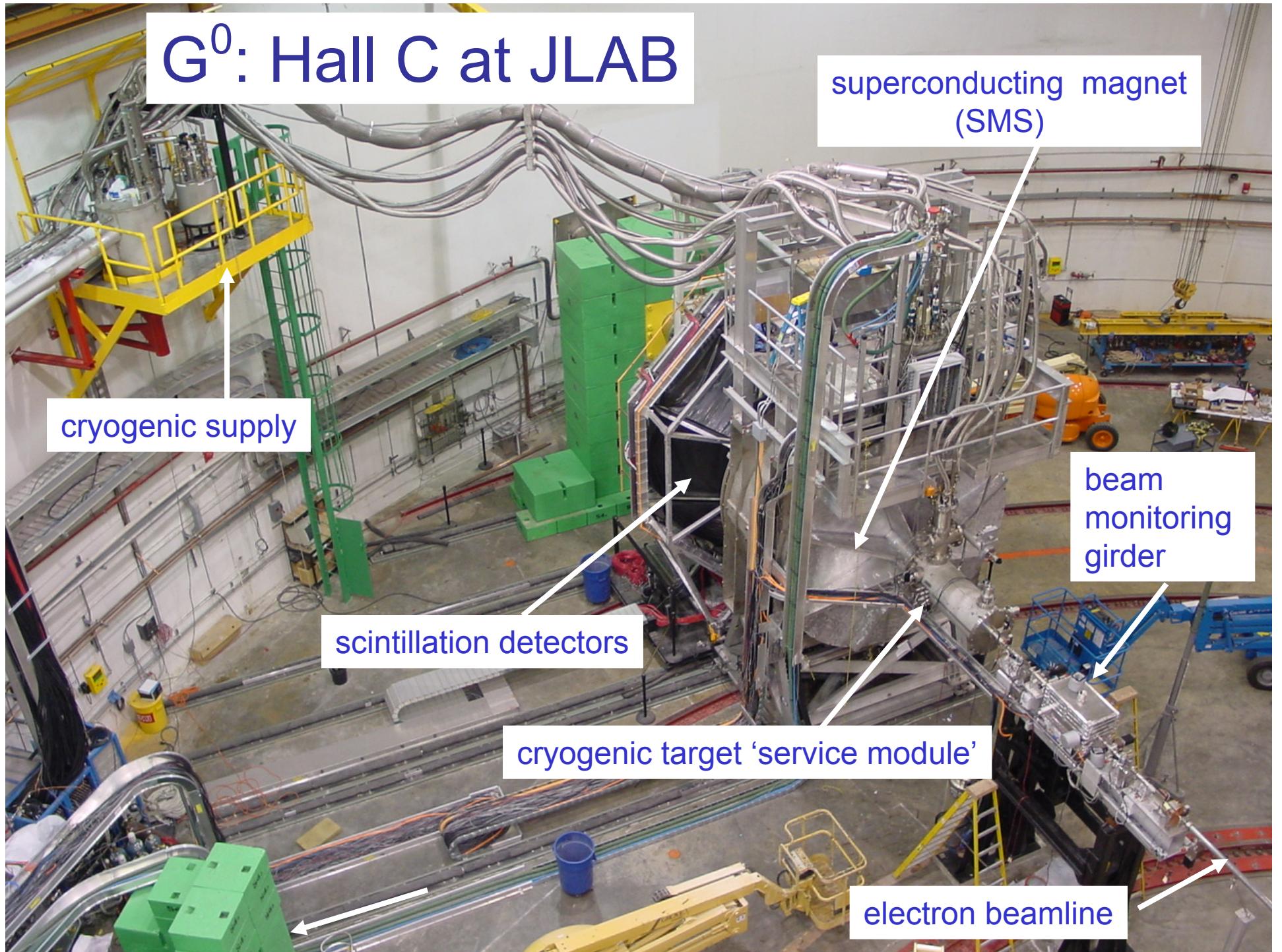
$$P_{\text{beam}} = 75\%$$

$$\theta = 52 - 76^\circ$$
$$104 - 116^\circ$$

$$\Delta\Omega = 0.9 \text{ sr}$$
$$0.5 \text{ sr}$$

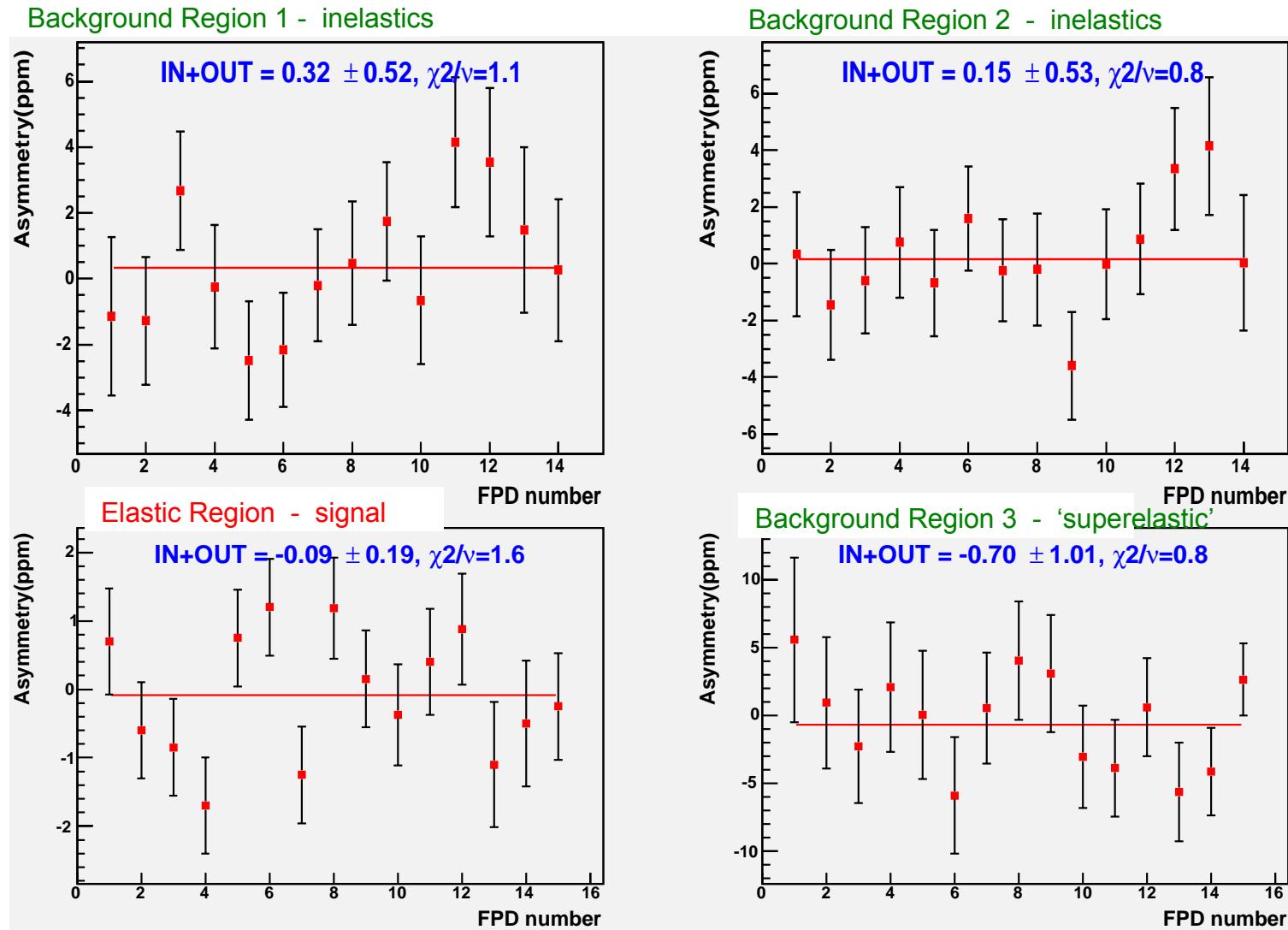
$$l_{\text{target}} = 20 \text{ cm}$$
$$L = 2.1 \times 10^{38} \text{ cm}^{-2} \text{ s}^{-1}$$
$$A \sim -2 \text{ to } -50 \text{ ppm}$$
$$-12 \text{ to } -70 \text{ ppm}$$

G^0 : Hall C at JLAB



G0: False Asymmetries

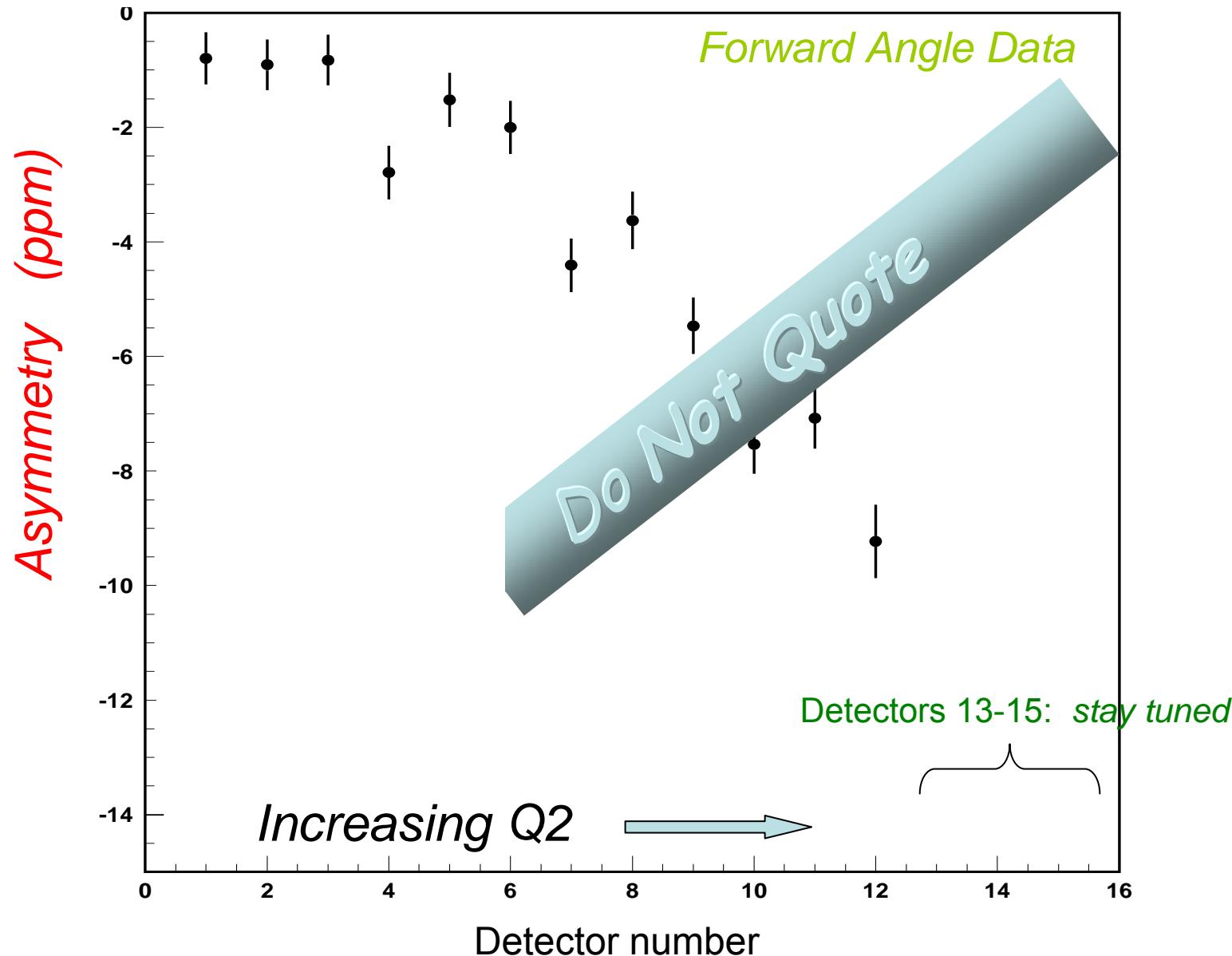
- ‘Manual’ helicity reversal
 - insert $\lambda/2$ plate in laser line, IN + OUT should cancel



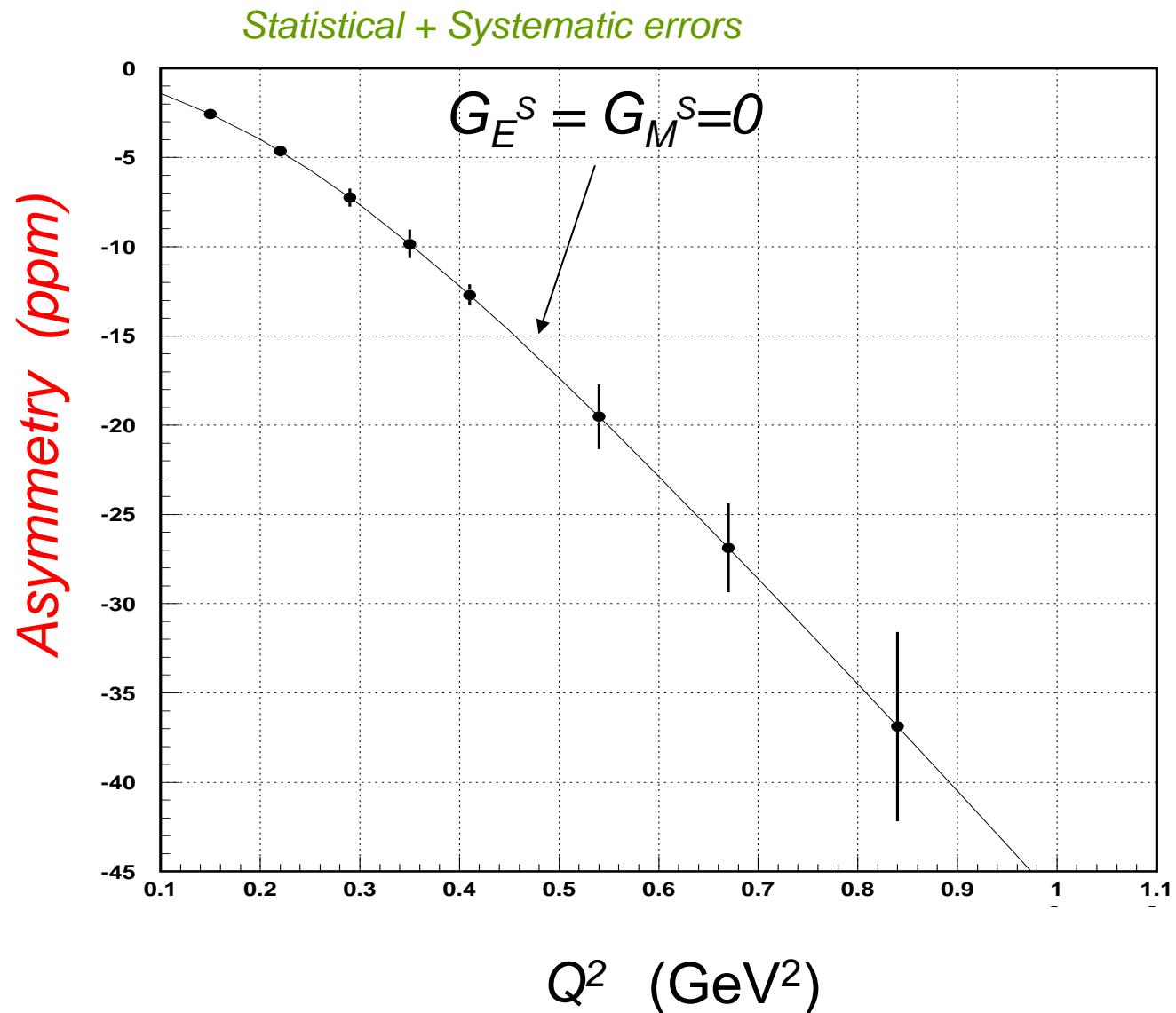
No evidence for electronic false asymmetries

G0 Preliminary Result: Blinding Factor of 25%

- Full statistics – present best background correction



G0: Presently Estimated Final Precision

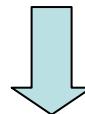


G0: Analysis Path

Start: Raw asymmetries



- Correct for deadtime 1% error ✓
- False asymmetries (beam parameters) 0.01 ppm ✓
- ‘Leakage’ correction 0.10 ppm ✓
- Beam Polarization 2% error ✓
- Background dilution & asymmetry (under study)
- Bin in Q^2 1% error ✓
- Radiative Corrections, EM form factors (to do)



Result: $G_E^S + \alpha G_M^S$

- errors likely dominated by backgrounds, esp. for large Q^2

G0 Appendix: Leakage Current Correction

- Unanticipated effect: leakage of beam from Hall A, B lasers into C
- Hall A,B beams are 499 MHz, Hall C beam is 32 MHz
- TOF cuts means elastic signal ‘sees’ 32 MHz beam, but beam current monitors respond to A+B+C beam
 - if large current asymmetry in A, B → false asymmetry in C beam
- Measure effect using signal-free region of TOF spectra
 - verify with studies with other lasers turned off + high-rate luminosity monitors
 - also verify with low-rate runs.
- Typical: 40 nA leakage, 40 μ A main beam; leakage asymmetry \sim 500 ppm
- **Net systematic uncertainty 0.1 ppm**

