G_{En} Mainz $\mathrm{D}(\vec{e}, e'\vec{n})$ Status

John R.M. Annand,
University of Glasgow
& Collaboration A1 Mainz

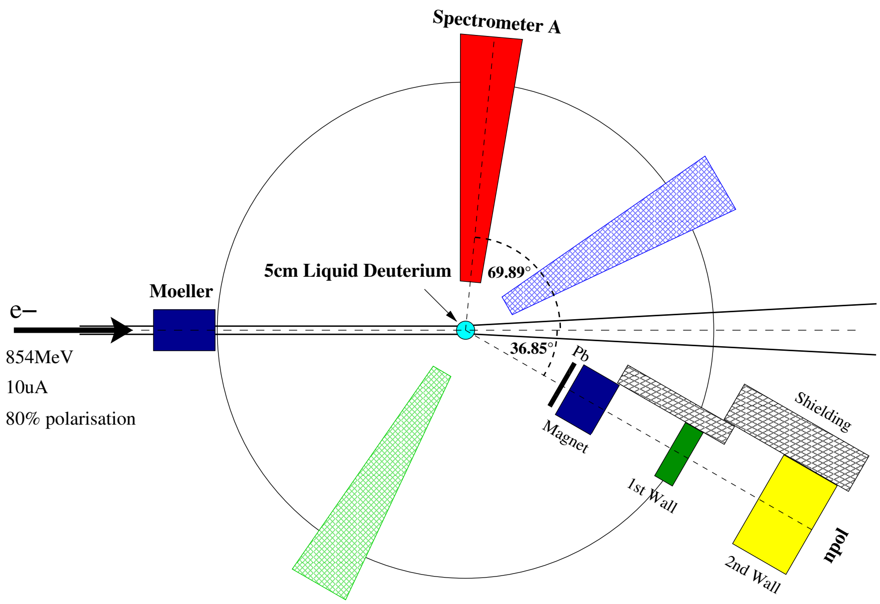
- A3 $\mathrm{D}(\vec{e}, e'\vec{n})$ dedicated exp-hall
  $Q^2 \sim 0.15,\ 0.3$ (GeV/c)^2

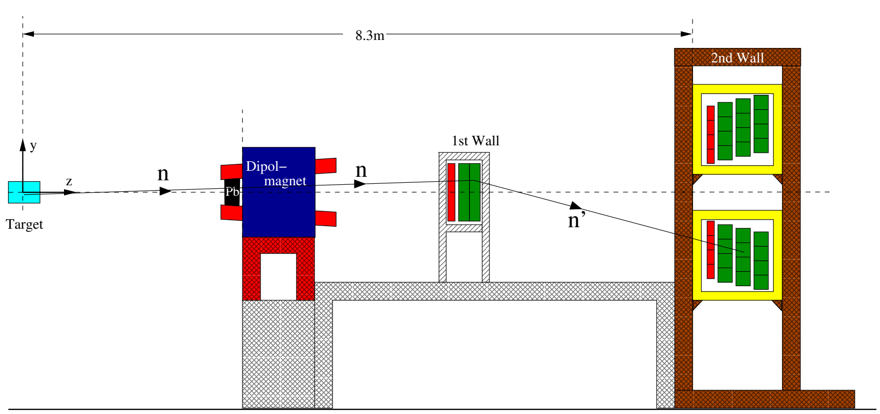
- A3 $^3\overrightarrow{\mathrm{He}}(\vec{e}, e'n)$ dedicated exp-hall
  $Q^2 \sim 0.3$ (GeV/c)^2

- A1 $^3\overrightarrow{\mathrm{He}}(\vec{e}, e'n)$ 3-spectrometer hall
  $Q^2 \sim 0.7$ (GeV/c)^2

- A1 $\mathrm{D}(\vec{e}, e'\vec{n})$ 3-spectrometer hall
  $Q^2 \sim 0.3,\ 0.6,\ 0.8$ (GeV/c)^2
  Analysis by Michael Seimetz (Mainz)
  and Derek Glazier (Glasgow)

A1 D($\overrightarrow{e}, e'\overrightarrow{n}$) $Q^2 = 0.6(GeV/c)^2$ Plan & Side View

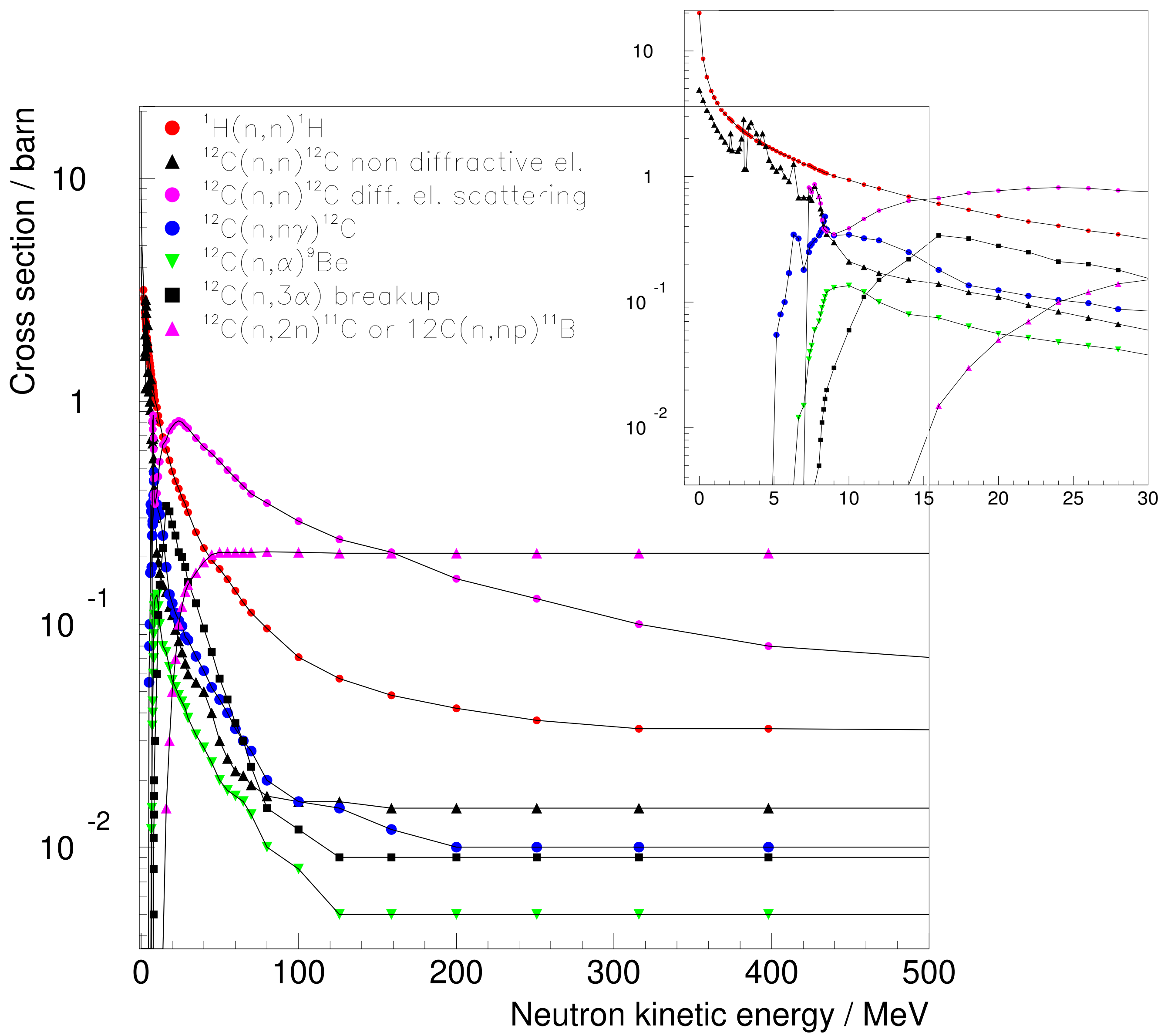




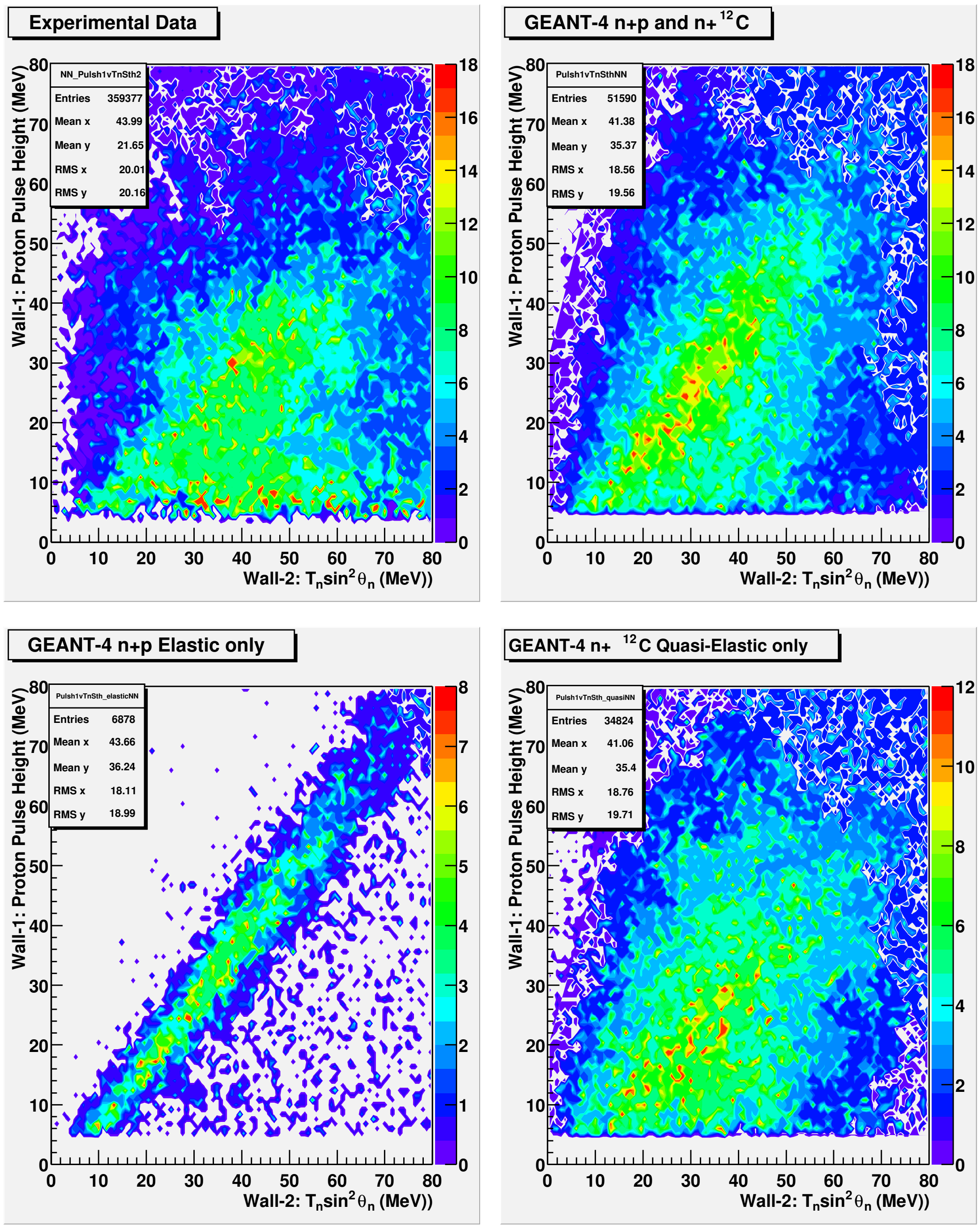
Neutron Polarimetry Simulations

- GEANT-4 based model by Derek Glazier
- Possible basis for future polarimetry design studies
- Rewrite n-p scattering, use SAID-generated cross sections and analysing powers. Polarimeter insensitive to elastic $n +^{12}\mathrm{C}$.
- Simple "toy" model (Fermi motion, binding) for quasi-free $^{12}\mathrm{C}\,(n, np)\,^{11}\mathrm{B}$ based on free $p\,(n, np)$ cross section and analysing power.
- Import methods of STANTON for other inelastic $n +^{12}\mathrm{C}$
- Include estimation of PH and TOF resolution
- How does elastic n-p + quasi-free $n +^{12}\mathrm{C}$ compare to data. $Q^2 = 0.8$ (GeV/c)^2 $\Rightarrow T_n \sim 400$ MeV.

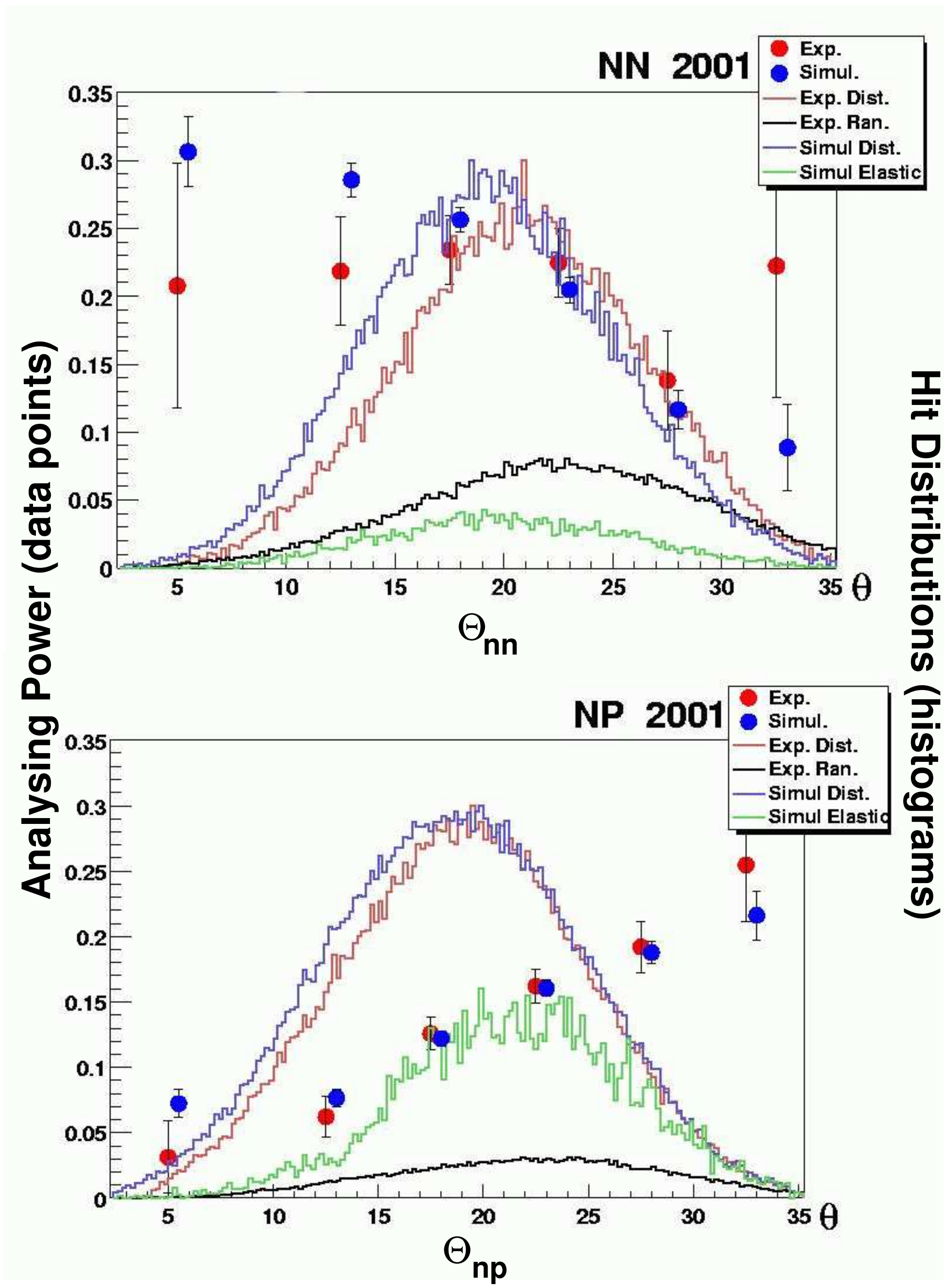
STANTON (1979): Employed Effective Cross Sections



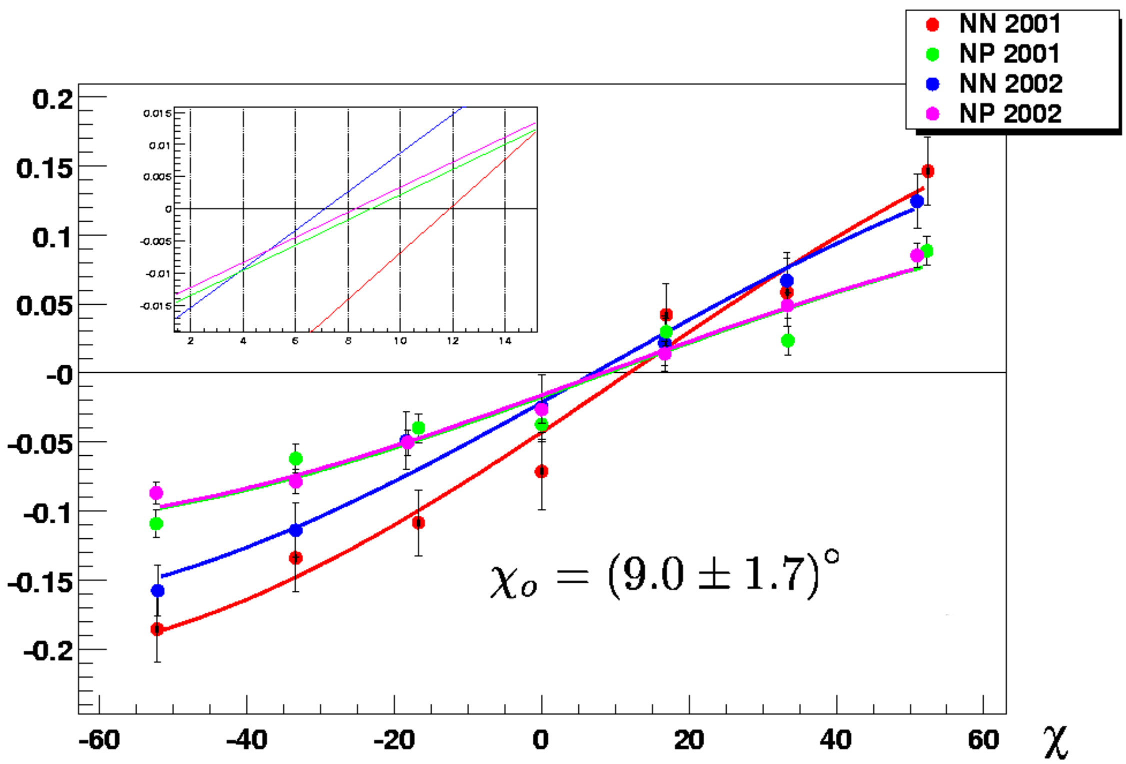
Polarimeter Response: proton pulse height, neutron TOF



Effective Analysing Power
PRELIMINARY



Measured Asymmetries vs Spin Precession Angle
$Q^2 = 0.8$ (GeV/c)^2 PRELIMINARY

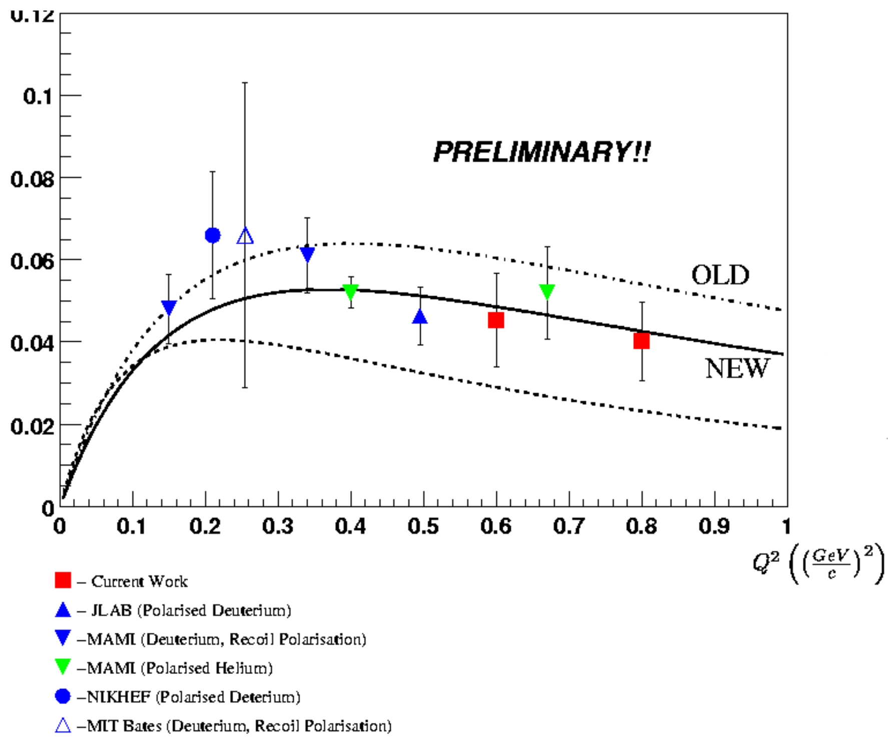


Cleaner signal for n-p compared to n-n.

Finalise n-TOF background subtraction (>1 MHz rates in some components of polarimeter)

Weighted mean $\chi_0 \rightarrow G_{En} \sim 0.05$

G_{En} Data at Low Q^2 PRELIMINARY



Plot shows preliminary data points as of May 2002. Magnitudes not expected to change significantly. *Final uncertainties...work in progress.*

FSI, MEC etc. (Arenhövel) corrections evaluated event-by-event during analysis

Lower curve: Galster fit to Platchkov et al D(e, e'). Upper curve: Galster fit based on A3 Mainz data

Middle curve: Galster fit including more recent data. PRELIMINARY 0.3 (GeV/c)^2 point not significantly different from this fit.