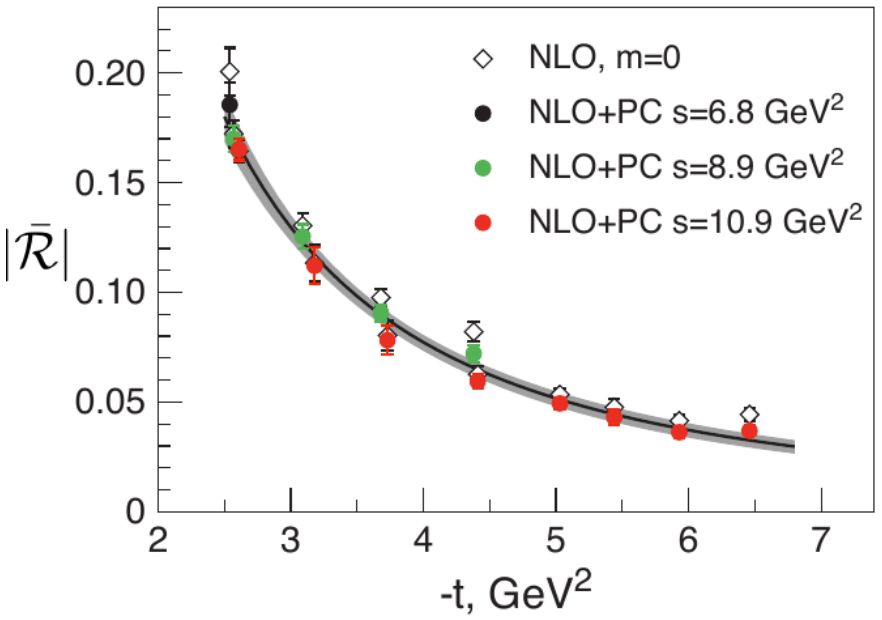
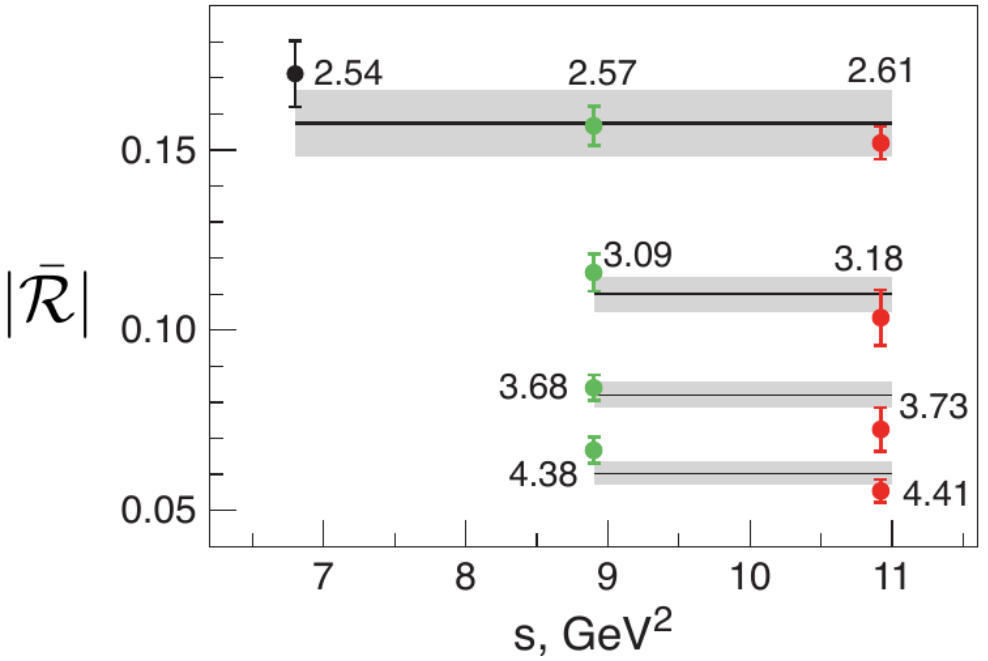
Hall C WACS with HIPS

- Starting assumptions:
  - s-independence of WACS form factors established from E99114 data for s, -t and -u > 2.5 GeV^2
  - This is for me the key constraint on any future WACS measurement – otherwise physics impact is severely diminished.





3 kinematic points -- 70, 90 & 120 degrees CM

	70	90	120
Ein [GeV]	7.0	7.0	7.0
s [GeV2]	14.0	14.0	14.0
-t [GeV2]	4.1	6.1	9.3
-u [GeV2]	8.1	6.1	2.9
pp [GeV/c]	3.0	4.1	5.8
thp [degrees]	33.5	25.3	15.0
Eg [GeV]	4.8	3.7	2.0
thg [degrees]	20.3	28.1	47.8
D BigBite [m]	1.5	2.5	3.5
D NPS [m]	3.0	3.0	1.0

- 8.8 GeV, 1uA beam on 9% Cu Radiator
- BigBite acceptance from dipole aperture
- BigBite momentum and angular resolution from 100 um position resolution in GEMs

Projected Uncertainties

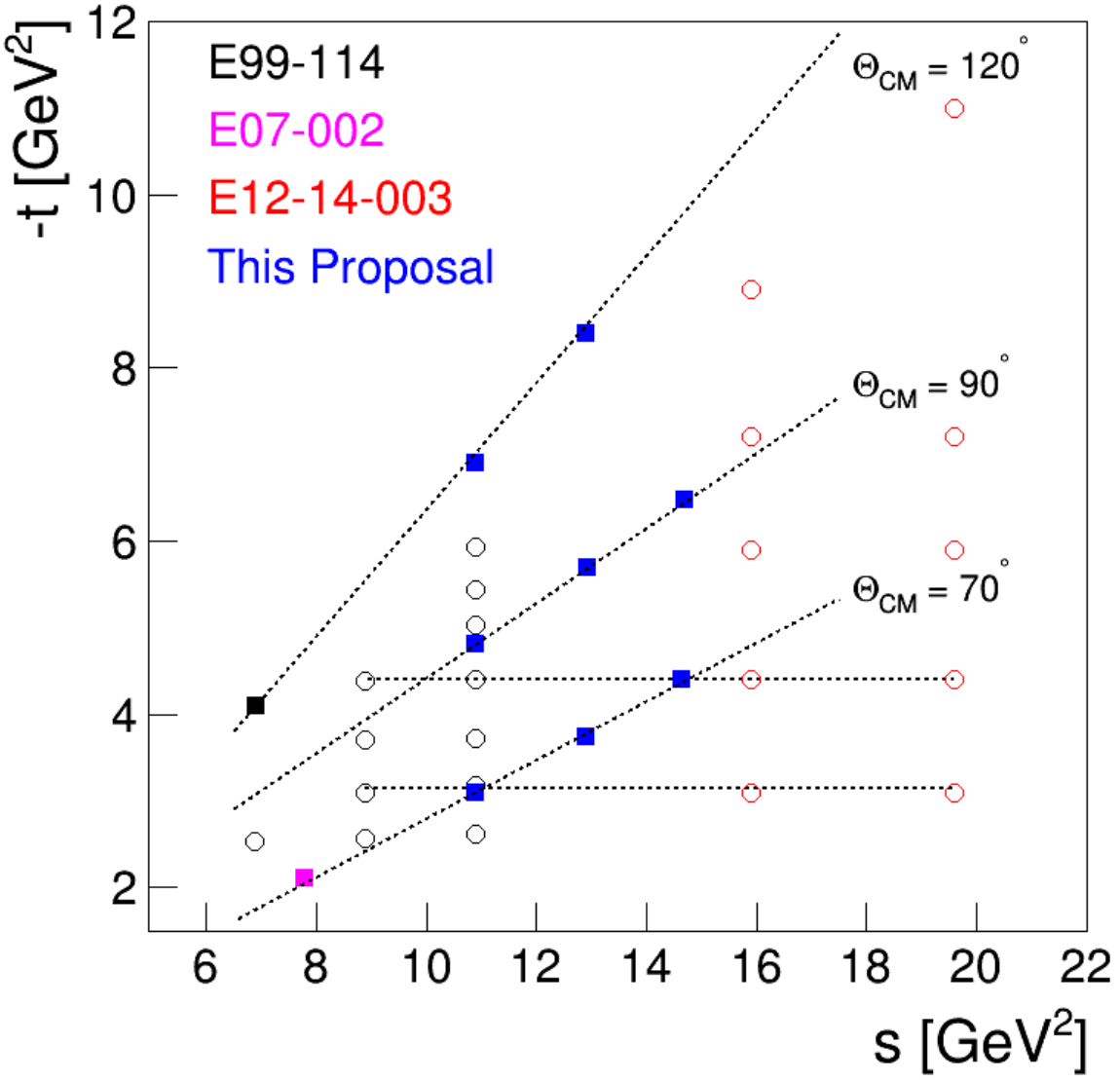
$$\Delta A_{LL} = \frac{1}{\sqrt{\frac{N_{RCS}}{D} P_p P_\gamma}}$$

-u > 2.5 GeV^2

- Three s-bins per kinematic setting at s = 11.1, 12.9 and 14.7 GeV^2
- Beamtime estimate assumes 3 uA

	P_{gamma}	P_p	D	N_{RCS} [/uA hour]	time (ΔA_{LL} < 0.05) [hour]
70s1 (5-6 GeV)	0.63	0.75	1.6	265	
70s2 (6-7 GeV)	0.72	0.75	1.8	117	
70s3 (7-8 GeV)	0.77	0.75	1.9	45	**20**
90s1 (5-6 GeV)	0.63	0.75	3.0	26	
90s2 (6-7 GeV)	0.72	0.75	3.4	12	
90s3 (7-8 GeV)	0.77	0.75	3.8	7	**220**
120s1 (5-6 GeV)	0.63	0.75	?	31 (5)	**?**
120s2 (6-7 GeV)	0.72	0.75	?	14 (11)	**?**
120s3 (7-8 GeV)	0.77	0.75	?	2 (1)	**X**

Polarised WACS Summary



Polarised WACS Summary

- We would like to measure ALL and ALT at 90 degrees and 120 degrees CM in a regime where factorisation of the reaction mechanism is established from data (s, -t, -u > 2.5 GeV^2). The realities achievable in reasonable beam time (<1000 h) were evaluated:

- ALL s-scan at 90 degrees CM can be done to acceptable statistical precision (+/- 0.05) with HIPS and 8.8 GeV beam. Best configuration would be SBS+NPS, although BB+NPS is also feasible (we lose the lowest s-scan). Work needed on BB high-momentum resolution and small angle capability and pi+ rates (in plan for July).

- Measurement at 120 degrees CM is difficult at 8.8 GeV as pion dilution is large. A measurement with lower beam energy is possible, but -u will be small (much smaller than the 2.5 GeV^2 needed for factorisation). The two lower s-scans at 8.8 GeV should be possible, but probably to a precision of +/- 0.1.

- The conditions for an additional point at 70 degrees CM are very favourable (<25 hours beamtime for +/- 0.05) and should be added.

- ALT is difficult, even for 90 degrees CM with 8.8 GeV beam as a result of target coil positions limiting angular range in the lab. It is predicted to be small in all theoretical models, so even higher precision is essential. This might be prohibitive.